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JOURNAL *of* FORESTRY



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JOURNAL of FORESTRY

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The Society is not responsible, as a body, for the facts and opinions advanced in the papers published by it. Editorials are by the Editor-in-Chief unless otherwise indicated and do not necessarily represent the opinion of the Society as a whole. The "leaders" preceding major articles are to be regarded as editorial additions.

EDITORIAL

DEFEATISM IN FORESTRY

OVER a period of 36 years the writer has participated in the sustained effort the country over to change the pioneer habits of thought of a nation from the destructive, outmoded practices of naive adolescent waste to a more mature, farsighted policy of conserving and renewing the productiveness of our land resources. Out of this struggle the profession of forestry was born, and has grown to maturity. On its shoulders has rested the responsibilities of developing and establishing simultaneously a new technique of silviculture for which no old world precedents existed, a nationwide system for fire protection in the face of utter public indifference and confirmed incendiary habits, a structure of public forests both national and state over the ingrained practices of traditional looting of the public domain and antisocialistic prejudices, an organization of trained, efficient public officials to administer the forest resources, despite the repeated and often successful attack of partisans of the spoils system and political corruption; and finally a new economic outlook for the future, notwithstanding the skepticism, doubts and open hostility of individuals and interests who, too often, have them-

selves in the past demonstrated only their astounding inability to foresee economic trends and avoid colossal errors.

These foresters, starting young and without experience and for the most part on small salaries, and not drawn from the ranks of the proud and mighty, have been successful in solving the tasks above enumerated to an extent that would have appeared impossible to a layman thirty years ago. In the fields of government and state service, in public education, and in private employ they have laid the foundations of enduring forest management. So great and so important is their contribution that now no public policy of land use or conservation, whether it be forest production, soil erosion, stream flow, game and fish management, marginal agriculture, or future economic relations concerning wood can be adequately dealt with without relying on the aid of members of this profession who have become experts in these lines.

With the growth both in volume and complexity of the field of forest conservation and its increasing contact with soils, game, erosion, floods, and economics; with the catastrophic maturing of the economic breakdown of taxation on pri-

vate cutover lands long foreseen by forester observers; with the final forced recognition by agriculture of a condition of surplus instead of the traditional land hunger that had defeated state efforts at public forestry for a generation; and with the real and pressing need to analyze the future prospects for wood use in the face of a universal gloomy pessimism of the lumber industry (only relieved by acrimonious assertions that their plight was due largely to the foresters' predictions of an approaching timber famine) it became evident that an earnest effort should be made to correlate and state the basic facts, or fruits of experience of the three decades of forestry practice, and with propriety, to endeavor to draw from this experience such conclusions and proposals as seemed most clearly indicated. This the Forest Service attempted, calling upon 56 of its older and more experienced men for treatment of different phases of this subject and endeavoring to the best of its ability to coordinate their efforts and draw such sound conclusions as seemed indicated, for future guidance. The result is the Copeland Report, full of flaws, inconsistent in places, but standing as a milestone or monument in forestry, from which the future will be dated.

At once the spirit of defeatism, which is inherent in human nature, finds a glorious target for its shafts. Not content with criticising its vulnerable points, and the acknowledged insufficiency of the basis of predictions which the authors so courageously stated, this criticism takes in the whole field of the profession and, as is the custom of defeatists, would shear it of its powers, interests and hope, and by successive restrictions eventually eliminate it as a constructive force in national affairs.

Specifically, some of the recent criticisms run about as follows:

1. Forestry should not assume "all"

the burdens connected with a land policy of forest devastation, because this policy was inevitable and unescapable and nothing could have been or can be done about it.

2. Abuse of ranges on the public domain (which are resulting in widespread erosion and silting of reservoirs) are of no concern to foresters despite their demonstration of proper range control on the national forests.

3. Submarginal farm land, abandoned, would be an unprofitable burden for foresters to assume (hence the policy of President Roosevelt in New York is wrong) because these lands (although lying close to centers of production and with well developed transportation facilities and soil that was at least considered as farm land once) belong, it is claimed, to the classes of land that constitute submarginal forest land, hence are doomed to lie waste and suffer erosion for fear of uneconomic expenditure of money on reforestation.

4. Although the effect of forest and other vegetative cover has so far not been comprehended by many American engineers (in contrast to those of European countries and Japan) the profession of forestry, whose special field is the study of the influences of such cover upon water flow, erosion, underground storage, absorption and silting, should step aside, and permit members of the engineering profession to make assertions in a field in which they are not specialists, and neglect factors whose far-reaching effects are of paramount importance to the public which is the final burden bearer of professional incompetence and errors. Shall foresters accept this easy way of sidestepping their responsibility in this field?

Many other "restrictions" of similar import would cheerfully be imposed on the profession by our defeatist critics, such as, the abandonment of established policies of state forest acquisition pending the final demonstration of ability to

control forest fires (this reversal of policy actually occurred in New Jersey); the cessation of timber growing until we can be sure that timber will be needed 50 or 100 years hence; the abolition of forest planting by either public or private agencies unless it can be demonstrated that such plantations will return 4, 5 or 6 per cent compound interest.

To sum up, say the critics, we agree that private forestry has broken down, but there is no help for it and nothing to be done about it; public forestry is uneconomic and the intangible values are a mere camouflage to conceal wasteful use of public funds; markets for wood are disappearing with no relief in sight, so why grow wood?

Every forward movement of the race is the result of conflict of ideas between those who would progress and those who would prefer to avoid the change and the effort to bring it about. To the extent that critics serve to point out weaknesses and fallacies in arguments, or unstable hypotheses, they perform an indispensable service. For without such criticism and freedom of discussion, unrestrained idealists may be guilty of inexcusable economic excesses, saddling the public with crushing burdens for generations or resulting in revolution and debt repudiation. Not the least of the responsibilities resting on foresters is that of controlling and checking such excesses in the light of tested facts and experience. But this is a long cry from the crippling philosophy of the defeatist.

The conclusions and recommendations of the Copeland Report may rest on insufficient facts. But they rest on more and better facts than have ever been marshalled previously in one document, and

they rest on the accumulated experience of the profession for 30 years. They may be fallacious and absurd, but to one who has observed and participated in the struggle for these three formative decades, they appear to be neither. Even the huge program of public acquisition advocated, calls for a sum (\$37,400,000) per year for 20 years which has been dwarfed into insignificance by many purely temporary recent expenditures, for which, in the future, far less enduring results may be shown.

After the recent annual meeting an editorial appeared in the Milwaukee Journal entitled "The Plodding Foresters" which was a caustic arraignment of the profession for failing to see its opportunities and rise to the level of the occasion. The editor, in response to a comment, later wrote, "I could go at some length discussing the great inferiority complex of the forestry profession. However, I'll spare you that."

So far the progress that has been made in forestry is due to those who have set up definite goals or programs, have believed them possible of attainment, and have left no stone unturned to master all of the facts which bear on the possible validity, success or failure of these programs. Witness the recent outcome of the conference on Article X of the Lumber Code. Forestry is indeed, but not for the first time, at the parting of the ways. It will not be the defeatists who carry the banner forward, but those who make themselves the targets for the shafts of criticism and from these very attacks learn the paths which lead to ultimate success.

H. H. CHAPMAN.

SECOND CONFERENCE ON THE LUMBER CODE

BY H. H. CHAPMAN

President, Society of American Foresters

THE preliminary work of this epoch-making conference was in the hands of six committees: 1. Forest practice. 2. Public timber disposal and public acquisition. 3. Taxation and forest credits. 4. Public coöperative expenditures. 5. Farm timberlands. 6. Emergency salvage timber. The committees were in almost continuous session in Washington, D. C., January 22-24. The most important work of the conference lay with Committee 1 on Forest Practice. A difficulty developed at once, based on the position taken by one of the representatives of the lumber industry, to the effect that the conference had no authority to pass on the regional codes of forest practice. After discussions which occupied a day and a half the committee decided that the conference had this authority, and resumed its consideration of the codes. Meanwhile a subcommittee had formulated a general proposal, which was later adopted by the conference and appears in this issue.

The final clause of this proposal as originally suggested would have stated in effect that the industry could not be expected to carry out the various code requirements without public coöperation in each state. The change from negative to positive affirmative was an important one.

The second question upon which a division of opinion was manifest was the proposal made by the Forest Service that a public representative be included as a nonvoting member upon each of the divisional boards. The industrial representatives on the whole were opposed to this as unnecessary, preferring to manage their own affairs and call for advice when need-

ed. Since the delegates to the conference were about equally divided, between public and industrial groups, the executive committee had ruled that on any question calling for a decision, the representatives of the two groups would vote separately and unless passed by a majority of each group, the conference would be recorded as rejecting the measure. After the position of the public representatives had been made clear to those of the industry, W. B. Greeley, in the afternoon session on January 25th, speaking for the industrial group, moved to accept such public participation. This was the only roll call of the conference, and of the ninety delegates, eighty voted to accept, and ten against the proposal, one of whom afterwards changed his vote to yes.

Two other subjects aroused much discussion, namely, the farm woodlands, and forest taxation. The difficulties arising over the administration of the code with respect to the farm woodlands and the small mill were given a thorough airing. The committee, on which was a strong representation of state forest extension men, worked long and earnestly over the problem of securing coöperation from the farmers and regulating the small mills whose production, uncontrolled by code agreements, was threatening the disintegration of code practices in the East and South.

Perhaps the most difficult problem, though not ranking in immediate importance with the code provisions, was that frankenstein creation known as the report on forest taxation. The committee early decided not to recommend any one plan but looked favorably upon the three plans

recommended by the Forest Taxation Inquiry known as the adjusted property tax, the differential timber tax and the deferred timber tax, while holding the door open for "some form of yield tax," or "any other plan designed to accomplish the same general purposes." This amicable agreement in committee was rudely shattered on the floor of the conference by delegate J. W. Blodgett of Grand Rapids, Michigan, who moved to strike out all but the preamble and substitute a demand that the President call at once a conference of governors, and instruct them to secure from their respective states laws under which, on the assurance of federal loans, the states would accept constitutional restrictions on assessed valuations and the adoption of some form of severance tax in lieu of property taxes. It was promptly pointed out by one of the committee that the deferred timber tax contemplated a similar but sounder plan by which taxes on timber would be advanced by the state and paid back, without interest, by the owner from yields when the timber was cut. The air became somewhat foggy and the matter was referred back to committee. After three and a half hours of further discussion with Mr. Blodgett on the principles of forest taxation, a second amicable agreement was reached by the committee and the delicate surgical operation was attempted of persuading the conference to adopt the amended report. At this juncture Mr. Wilson Compton arrived, grasping firmly in one hand the original draft of the Blodgett resolution. The next hour was quite painful and consisted largely of parliamentary technicalities which culminated when Col. Graves as presiding officer put a motion to adjourn till 8 p. m. to everyone's relief.

The report was *not* again referred back to the committee. The leading delegates of the industry were coralled in the Cosmos Club by Mr. Rexford Black, one of the tax committee members, and at 8

p. m. when the conference reconvened, Mr. Black offered an amendment embodying the essentials agreed upon, which was unanimously accepted.

Two reports which were not only unanimous but were adopted without division of opinion were those of Committee 4 on public coöperation expenditures and Committee 2 on public timber disposal and acquisition.

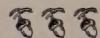
The atmosphere of the conference and committees throughout was one of sincerity and an earnest and conscientious effort to reach agreement on measures which could be carried out in good faith by the industry. The public representatives, also largely representing the profession of forestry, and the lumber industry, among whom were many foresters, worked side by side on all committees, and the conference was not marred in a single instance by an open and final disagreement on any disputed point. The closing session at which Mr. C. C. Shepard, President of the National Lumber Manufacturers' Association, spoke for the lumbermen, and Mr. F. A. Silcox, Chief of the Forest Service for the public interests, was marked by an atmosphere of genuine good will, satisfaction and confidence in the intentions and prospects for carrying out the true intent of Article X. Col. Graves voiced this satisfaction when called on for the closing remarks. In response to a general sentiment the organization of the conference was perpetuated in the form of a committee of ten, five each for the industry and the public agencies, who immediately undertook the task of final formulation of the procedure.

The regional codes, discussion of which was the main concern of committee 1, were found for the most part to be defective, and were referred back to the various regions for amendment and strengthening. The conference in final action decided that these codes when adopted would have the force of law, and would be is-

sued as bulletins by the Code authority. This was probably the most important conclusion of the conference and goes a long way towards assuring the observance of the recommended practices in the woods.

No one can safely predict what the future will bring forth, but one thing is certain. The second conference on the

lumber code was a genuine effort on the part of all concerned to recognize and seriously shoulder the responsibility for the proper conservation of the privately owned timber lands of the nation, under Article X of the Lumber Code. This marks the dawn of a new era in forest conservation for America.



TIMBER DEPLETION IN WESTERN WASHINGTON AND WESTERN OREGON—1925-1929

During the period 1925-1929 the average annual depletion of saw-timber from cutting operations in western Washington and western Oregon amounted to 9,891 million board feet, log scale. Log production accounted for 95 per cent of this depletion, fuelwood 3.5 per cent, pulpwood 1 per cent, and veneer blocks, shingle bolts and posts 0.5 per cent.

The depletion of timber less than saw-timber size (16 inches at breast height) annually amounted to 82,420,000 cubic feet of solid wood, of which fuelwood production accounted for 74 per cent, poles and piling 16 per cent, pulpwood 9 per cent, and posts, mine timbers, hewed ties and excelsior bolts 1 per cent.

Sixty-seven per cent of the sawtimber and 51 per cent of the non-sawtimber depletion occurred in western Washington, the remaining percentages in western Oregon. The depletion represents only the material actually utilized, and does not take cognizance of the large quantity of sound material left in the woods as waste.

Of the sawtimber depletion Douglas fir supplied 73 per cent, western hemlock 13 per cent, western red cedar 7 per cent, Sitka spruce 4 per cent, and miscellaneous softwoods and hardwoods 3 per cent. Of the depletion less than sawtimber size Douglas fir constituted 76 per cent, the hardwoods 8 per cent, western red cedar 7 per cent, western hemlock 4 per cent, white fir 2 per cent, Sitka spruce 1 per cent, and miscellaneous softwoods 2 per cent.—H. M. JOHNSON, *Pac. N. W. For. Experiment Station.*

CONFERENCE OF LUMBER AND TIMBER PRODUCTS INDUSTRIES WITH PUBLIC AGENCIES ON FOREST CONSERVATION

FOR more than a generation the conception of continuously productive forest lands, permanent forest industries and stable forest communities has been steadily growing in the United States. Vast areas of the public domain were set aside as national forests dedicated to forest production. The nation further adopted the policy of increasing such areas by purchase. A nation-wide plan of fire protection for forest lands was made partially effective, combining the resources of federal government, states and often private interests. Sustained yield forest management became the objective on national forests, to some extent on other public forests and in a limited number of cases on private forest lands.

Forest conservation by private action, however, has generally encountered insuperable difficulties. But difficulties have not prevented the advance of the idea that from many points of view all timberlands, private as well as public, should be maintained, in a high state of productiveness. The public view has become clearly crystallized that this somehow must be done. Forest owners and industries, although sensing fully the need, have felt unable alone to solve the problem. But they were willing to assume their full share in a broad program of national forest conservation and even more to take leadership if given the public support and coöperation required to insure success.

This was the attitude of the lumber industry when the National Industrial Recovery Act of June 16, 1933, opened a wide door for action. The industry responded at once by formulating a code program in which forest conservation stood forth as one of the basic objectives. Recognizing that a matter of such pro-

found importance and far-reaching application could not be determined in haste, the industry in Article X of its general Code of Fair Competition obligated itself to undertake in coöperation with public and other agencies such practical measures as may be necessary to accomplish the declared purposes of conservation and the sustained production of forest resources. The same article provided for the working out of practical measures by the industry and of a program of action by the public through a joint conference to be called by the Secretary of Agriculture.

Pursuant to the call of the Secretary, the first session of the Conference was held on October 24-26, 1933, and was participated in by delegates representative of the regional divisions of the industry and of public agencies, including federal, state and other conservation agencies. The Secretary of Agriculture was represented by the U. S. Forest Service which took leadership in representing public agencies. The purpose of the first conference was to formulate a preliminary conservation program to be submitted to the regional agencies of the lumber industry for critical analysis and suggestions prior to adoption of a final program at a later conference. Initial deliberations were on proposals submitted by both public and industry representatives. In order to facilitate discussion and the forming of conclusions appropriate committees made up of public and industry members of the Conference were designated to deal with various subjects. The reports of the Committees were laid before the general conference, freely discussed and acted upon by a vote of the whole conference.

Promptly following the conference, the

proposals as adopted were submitted to the regional agencies of the industry for their further study and recommendations and with instructions that each regional agency prepare rules of forest practice applicable to its region for presentation at a later conference. So similar were the proposals of industry and the public on forest practices that an executive committee was provided and instructed to reconcile the proposals into a joint statement. This statement was later submitted to the regional divisions of the industry.

In recognition of the immense task of preparing regional reports and formulating regional rules and regulations of forest practice, the second conference was not called until January 25, 1934. Representation at this conference was the same as the conference of October 24-26 and the subject matter was handled through the same committees with all reports and recommendations finally acted upon by the general conference.

With notable unanimity the conference representatives agreed upon a well defined plan of procedure to accomplish the objectives of conservation and sustained production of forest resources. The program calls for definite action on the part of the lumber industry in the prompt initiation and administration of forest practices designed to promote the conservation of its resources; it calls upon the states and the federal government for a coöperative program of public action in respect to forest protection, public timber disposal, public acquisition of forest lands, forest credits, forest taxation, forest research and other aspects of the forest problem involving public responsibilities. Under Article X of the Lumber Code the recommendations of the conference in respect to action by the industry are subject to the approval of Lumber Code Authority, and the conference recommendations in respect to public action are subject to the approval of the Secretary of Agriculture.

The program as a whole, it is understood, is subject to the approval of the President.

ROSTER OF CONFEREES

Chairman: Henry A. Wallace, Secretary of Agriculture; Vice Chairman: Henry S. Graves, Yale University; Secretary: Wm. L. Hall, Hot Springs, Arkansas.

INDUSTRY CONFEREES

(Those invited by the Lumber Code Authority)

Lumber and timber.—H. C. Berckes, Southern Pine Assn.; Swift Berry, Michigan-Calif. Lbr. Co., Western Pine Assn.; S. R. Black, Calif. Forest Protective Assn.; J. W. Blodgett, Blodgett Company, Ltd.; C. A. Bruce, Exec. Officer, Lumber Code Authority; J. M. Bush, Cleveland Cliffs Iron Co., Northern Hemlock and Hardwood Mfg. Assn.; P. R. Camp, Camp Manufacturing Co., Southern Pine Assn.; C. S. Chapman, Weyerhaeuser Timber Co., West Coast Lumbermen's Assn.; H. W. Cole, Hammond-Little River Redwood Co., Calif. Redwood Assn.; R. A. Colgan, Diamond Match Co., Western Pine Assn.; Wilson Compton, National Lumber Mfrs. Assn.; A. G. Cummer, Cummer Cypress Lbr. Co., Southern Cypress Assn.; R. E. Danaher, R. E. Danaher Co.; E. W. Demarest, Pacific National Lbr. Co., West Coast Lumbermen's Assn.; D. S. Denman, Pacific Spruce Corp., West Coast Lumbermen's Assn.; G. L. Drake, West Coast Lumbermen's Assn.; J. J. Farrell, Northeastern Lbr. Mfg. Assn.; A. C. Goodyear, Great Southern Lbr. Co.; W. B. Greeley, West Coast Lumbermen's Assn.; H. E. Hardtner, Urania Lbr. Co.; E. A. Hauss, Southern Pine Assn. (Rep. L. O. Crosby); F. V. Hebard, Independent Timber Land Owners in the South; H. C. Hornby, Northwest Paper Co., Northern Pine Assn.; G. F. Jewett, Potlatch Forests,

Inc.; C. R. Johnson, Union Lbr. Co., Calif. Redwood Assn.; G. T. Kirby, Calif. Redwood Assn.; B. W. Lakin, McCloud River Lbr. Co., Western Pine Assn.; G. E. Marshall, Northern Pine Assn.; D. T. Mason, Western Pine Assn.; J. G. McNary, Cady Lbr. Corp., Western Pine Assn.; A. G. T. Moore, Southern Pine Assn.; E. R. Linn, Hardwood Mfrs. Institute; John Raine, Meadow River Lbr. Co., Hardwood Mfrs. Institute; A. B. Recknagel, Cornell University, Northeastern Lumber Mfrs. Assn.; C. C. Sheppard, President, National Lumber Mfrs. Assn.; J. W. Sewall, Consulting Forester, Old Town, Maine, Northeastern Lbr. Mfrs. Assn.; O. T. Swan, Northern Hemlock and Hardwood Mfrs. Assn.; J. D. Tenant, Long-Bell Lbr. Co., West Coast Lumbermen's Assn.; A. R. Watzek, Crossett Western Co., West Coast Lumbermen's Assn.; J. W. Watzek, Jr., Crossett Watzek Gates, Southern Pine Assn.; R. M. Weyerhaeuser, Northwest Paper Co.; N. P. Wheeler, Jr., Wheeler & Duzenberry Lbr. Co., Northeastern Lbr. Mfg. Assn.

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Naval stores.—R. E. Bendict, Brunswick Peninsula Co.; C. F. Speh, Pine Inst. of America.

PUBLIC CONFEREES

(Those invited by the Secretary of Agriculture)

National Grange.—Fred Brenchman.

American Farm Bur. Fed.—W. R. Ogg (representing Chester Gray).

U. S. Chamber of Commerce.—W. Dub. Brookings (representing T. G. Woolford).

Amer. Forestry Assn.—P. W. Ayres, Boston, Mass.; O. M. Butler and G. H. Collingwood, Washington, D. C.; S. T. Dana, School of Forestry, Ann Arbor, Mich.; R. B. Goodman, Marinette, Wis.; Joseph Hyde Pratt, Chapel Hill, N. C.

Society of Am. Foresters.—H. H. Chapman, New Haven, Conn.; Ward Shepard, Washington, D. C.; Franklin Reed, Washington, D. C.; W. F. Ramsdell, Ann Arbor, Mich.

Am. Tree Assn.—Tom Gill, Washington, D. C.

U. S. Forest Service.—F. A. Silcox, E. I. Kotok, S. B. Show, Burt P. Kirkland, R. E. Marsh, R. Zon, Fred Morrell, E. E. Carter, L. F. Kneipp, C. P. Winslow, C. J. Buck, Earle H. Clapp, W. N. Sparhawk, R. C. Hall, R. D. Garver, R. M. Evans, E. N. Munns, E. L. Demmon, Evan Kelley, Willis M. Baker, E. W. Tinker, J. C. Kircher.

State Foresters.—W. G. Howard, New York; H. L. Baker, Florida; Linn F. Cronemiller, Oregon; G. M. Conzet, Minnesota; L. E. Staley, Pennsylvania; P. H. Merrill, Vermont; Edmund Secrest, Ohio; S. G. Fontana, Michigan.

Indian Timber Service.—Robert Marshall.

Agricultural Extension Service.—W. K. Williams, Washington, D. C.; R. W. Graeber, North Carolina; K. E. Barracough, New Hampshire; D. E. Lauderburn, Mississippi; J. A. Cope, New York.

National Recovery Administration.—E. A. Selfridge.

Department of Commerce.—Axel H. Oxholm.

State of Washington.—C. S. Cowan.

DIGEST OF CONFERENCE RECOMMENDATIONS

All material presented to the Conference was in the form of reports by the six committees established at the Conference session of October 24-26, 1933, viz, I Forest Practice; II Public Timber Disposal

and Public Acquisition; III Forest Taxation and Forest Credits; IV Public Co-operative Expenditures; V Farm Woodlands; VI Emergency Timber Salvage. The full committee reports, as amended and adopted by the conference are given further on.

The following is a brief summary of conference recommendation requiring public and industry action to secure sustained production of forest resources, including the adoption of rules of forest practice and their enforcement under the Lumber Code, changes in industrial and public administrative policy, new legislation, amendments to existing legislation and federal and state appropriations. (See key on page 283 for explanation of reference letters.) The conference's recommendations are also summarized in the accompanying diagram.

SUSTAINED PRODUCTION OF FOREST RESOURCES

Committee 1

A common purpose grounded equally in public welfare and industry welfare dictates that all forest land hereafter to be cut over under the Lumber Code Jurisdiction shall be left in favorable condition for regrowth.

SPECIFIC MEASURES OF FOREST PRACTICE

To carry out the above requirement industry will undertake and promptly put into effect the following measures:

1. *Forest Protection During Logging* (I.A.) which includes:

a. Responsibility for adequate provisions and practical measures of fire control on individual operations during and immediately after logging.

b. Responsibility of each operator for protection on his lands to the extent that he has created a hazard, even though general coöperative fire protection is in

effect, but not for fire hazards caused by public carelessness or inadequate public fire protection.

2. *Coöperation in Protection Against Fire, Insects and Disease* (I.A.) Industry obligates itself to endeavor to secure action of all operating and non-operating timber land owners in direction of co-operating with public agencies in fire prevention and suppression and to the extent practicable, to extend such action to include protection against disease and insects.

3. *Conservation of Immature Trees and Young Growth* (I.A.) This requires care in logging so that, in so far as practicable, all young trees of valuable species will be preserved and left without injury for future growth.

4. *Provision for Restocking the Land after Cutting* (I.A.) This is to be accomplished by natural regeneration through leaving seed trees in groups or singly or a part of the merchantable stand as in partial cutting and where desirable, by planting.

Industry will take prompt action to determine the extent to which it is practicable to put the following into effect and upon determination establish standards of practice to this end.

5. *Partial Cutting or Selective Logging* (I.A.) To the extent practicable this shall be considered the general standard for local measures of forest practice. Industry will promptly take steps including the use of studies already made, to determine by regions the extent to which trees of merchantable sizes may be left as a part of the growing stock and in cases where this is desirable, establish the necessary cutting practices and put them into effect. Operators may submit individual management plans differing from regional standards, and if they equal or excel such standards, may be accepted in lieu thereof.

6. *Sustained Yield* (I.A.) This shall

be adopted as the objective of forest management for individual tracts or groups of tracts and put into effect as rapidly as various considerations permit and owners find it advantageous.

DIVISION ADMINISTRATIVE MACHINERY

7. In each Division, set up agency or agencies on forest practices with non-voting public advisory representatives (state, federal and farm extension services) to formulate and enforce necessary rules of forest practice. (I.A.)

8. For the purpose of carrying out above practices, furnish necessary technical and other qualified personnel. (I.A.)

SPECIFIC DIVISION MEASURES OF FOREST PRACTICE

9. Such measures must conform to requirements enumerated in the six headings under "Sustained Forest Production." (I.A.)

ALLOTMENTS TO ENCOURAGE SUSTAINED YIELD

10. To encourage sustained yield, Lumber Code Authority requested to give preference in Code production allotments to operators observing the practice. (C.C., L.C.A.)

TIMBER LEASES

11. Due consideration shall be given to the ownership equities involved in timber leases now existing, in order to avoid unreasonable hardship in the matter of requiring the leaving of merchantable sizes of trees. (L.C.A.S.A.)

12. Future timber leases should be made subject to provisions of Article X and enforceable against both operator and owner. (I.A.)

SUPPLEMENT TO ARTICLE X

13. Recommends supplement to Article X to include basic provisions for forest conservation on private lands, and recommends that rules of forest practice be issued and made legally effective by the Authority. (C.C.L.C.A.)

PUBLIC TIMBER DISPOSAL

Committee 2

14. Public forests to be managed, so far as practicable, on a sustained yield basis, and, where not in conflict with public interest, in coöperation with private forests so as to place the latter also on a sustained yield basis. (FL or AP; SL or SP & I.A.)

15. Public timber disposal should be governed by a policy of extreme conservatism, recognizing demonstrable demand for public timber products (F.S. & S.P.)

16. There should be temporary relief legislation authorizing reasonable flexibility in public timber sale contracts to prevent unreasonable losses through purchases made during periods of high stumpage prices. (F.L.)

REVESTED LAND GRANT FORESTS

17. To prevent rapid liquidation of revested land grant timber, and to place this timber under forest management, such grants should be transferred to Forest Service and managed as national forests. (F.L.) Until June 30, 1936, continue the present basis of tax compensation to the counties. U. S. Court of Claims to determine the value of such property at date of revestment and determine the respective equities of states and counties and the U. S. Reclamation Fund. The United States to retire equities so determined. (F.L. & F.A.)

PUBLIC ACQUISITION OF FOREST LANDS

18. To restore and sustain growing stocks to maintain permanent yield of forest products, to assure permanency of forest industries, communities and employment, and to promote coöperative sustained yield units, public forest acquisition as outlined in the Copeland Report, involving 224 million acres, should be consummated, including not less than 150 billion feet of standing timber. (S.L. & F.L.)

19. Adequate financial provision for the development and management of the publicly acquired lands and timber. (F.L.)

20. To stabilize county revenues in connection with the land acquisition program, Secretary of Agriculture should appoint a committee to study the problem and submit its findings. (S.A.)

21. To facilitate the blocking of both public and private lands in the interest of forest management, federal laws should at once be amended removing existing limitations relative to state boundaries upon land and timber exchanges, and also be made applicable to private lands outside of national forests. (F.L.)

22. Section 7 of the Clarke-McNary Act should be amended to authorize the Secretary of Agriculture, in his discretion, to accept donations of lands chiefly valuable for national forest purposes from private owners, counties and states, subject to federal payment of such taxes as may be outstanding against such lands. (F.L. & F.A.)

23. States and counties should adopt the policy proposed in amendments to Section 7 of the Clarke-McNary act. (S.L.)

FOREST CREDITS

Committee 3

24. A permanent forest credits system should be made available for the following purposes:

a. To improve the productivity of organized forest properties, including restricting cut to permit building up growing stock, fire protection, annual tax payments and necessary silvicultural measures.

b. To assist in orderly marketing of mature timber, or, in exceptional cases, to withhold from market, timber lands which it would be economically injurious to throw on an over-burdened market.

c. To assist in acquiring tracts and assembling them into units of economic size and location for continuous yield operations.

d. To assist in constructing permanent transportation systems within forest properties and to connect them with common carrier facilities.

e. To assist such states as may adopt a sound method of forest taxation which requires state financing.

f. To meet the above needs during the present emergency pending a permanent forest credits set-up, a revolving fund of \$200,000,000 should be federally appropriated to constitute a special fund from which the appropriate agency may lend to states and/or individuals for such purposes. (On paragraphs "e" and "f," Forest Service representatives did not vote and reserved decision.) (F.L. and F.A.)

FOREST TAXES

25. It is recognized that the existing system of state and local taxation is detrimental to conservative forest management, and that the federal government should take the initiative in promoting remedial action by the states of the following character:

a. Reduction of the total burden of taxation on real estate, without curtailment of necessary public functions.

b. Improved administration of the property tax, particularly as to methods of assessment and collection.

c. Adoption of a method of forest taxation which will give appropriate treatment to forests where deferment of income is required. (P.A. F.L. & S.L.)

It is recommended that the President be asked to lay this matter before the governors, and impress them with the need for immediate action, the joint committee to work out a more detailed program for recommendation to the President in this connection. (The joint committee has prepared a statement recommending a specific plan of forest taxation which involves deferment of taxes on timber until income is realized, for adoption in states where the need for immediate action is most acute. Subject to the same Forest Service reservation previously noted in No. 24, it was proposed that the federal government offer to lend money to the states to assist them in financing a sound plan of forest taxation.)

26. It is recommended that provision be made for continuing a forest taxation unit in the Forest Service. (F.L. & F.A.)

FIRE CONTROL

Committee 4

27. The twenty-five per cent of the 1934 Clarke-McNary Fire Control appropriation which is impounded should be released or replaced from other sources to prevent the breakdown of forest fire protection facilities this fiscal year. (P.A.)

28. In view of increased fire protection measures proposed under Article X of the Code, it is essential that the entire authorization of \$2,500,000 under the Clarke-McNary Act be appropriated and made available the fiscal year 1935. (P.A.)

29. To effectuate the fire control requirements of Article X of the Code, Clarke-McNary Fire Control authorization should be increased from \$2,500,000 to \$10,000,000. (F.L.)

30. Since many benefits, such as ero-

sion control, watershed improvement, soil and game protection, recreation, increased national taxable wealth, etc., inure to the public, and since over half the fires result from sources beyond the private owner's control, the federal government should increase its fire protection contribution from the present 25 per cent basis to a 50 per cent basis. (F.L. or A.P.)

CONTROL OF FOREST DISEASES

31. The \$250,000 annual authorization under the Clarke-McNary Act for native tree disease research, should be made available. The federal government should reinstate in the budget for the fiscal year 1935 and continue appropriations for research on recently introduced tree diseases. (F.A.)

States should give greater support to forest disease research, particularly on diseases of local importance. (S.L.)

32. The federal government should restore its appropriations in the budget for white pine blister rust control and not limit funds for such work to emergency work conducted under the C.C.C. or N.R.A. relief programs. The amount of this appropriation is \$375,233 per year. (F.A.)

FOREST INSECT CONTROL

33. The survey phase of insect control should be financed by the public, with the federal and state governments sharing expenditures. Federal appropriation of \$500,000 per year is needed to provide supervision of insect control projects. The private landowner shall pay part or all of the cost of actual control work, with supervision furnished by the public. (F.L. & S.L.)

States should, where possible, appropriate funds to assist in defraying the cost of insect control supervision on forest lands. (S.L. S.F.)

FOREST ECONOMIC SURVEY

34. The federal forest economic survey should be extended to include determination of logical sustained yield units with supporting facts. For this purpose, a federal appropriation of \$500,000 per year should be made available until the survey is completed, and thereafter provision made for keeping up to date survey data. (F.A.)

FOREST RESEARCH

35. The federal government should undertake an immediate and continued expansion of forest research to provide the facts and information necessary to attain the objectives of Article X of the Lumber Code. Beginning with the fiscal year 1935, federal forest research should be progressively increased to a basis of \$2,700,000 by 1938, and thereafter by \$325,000 annually until 1944. (F.L. & F.A.)

36. Federal funds already appropriated for forest research but now impounded should be released or replaced from other sources to permit continuation of needed work during 1934. (P.A.)

FOREST EXTENSION

37. Extension of knowledge regarding timber growing, logging, etc., is a public function and should be placed on the same basis as knowledge regarding farm crops. The federal government should match, on a dollar-for-dollar basis, forest extension contributions of states. (S.L., S.F., F.L., F.A.)

38. Where state forest extension service is lacking, the federal government should make such extension service available to inform the owners of forest lands as to results of its research work and forestry practices. (F.L.)

39. Federal contribution to farm wood-land extension authorized by the Clarke-

McNary Act should be increased from \$100,000 annually to \$250,000 annually, and an additional authorization of \$375,000 annually is required to meet the needs of private forest owners other than those owning farm wood-lands. (F.L.)

FOREIGN ECONOMIC SURVEY

40. Experience and accomplishment of foreign countries in the field of forestry contain much of value to this country in its national forestry undertaking. To make available the above information, the federal government should restore the position of Forester with the Foreign Service of the U. S. Department of Agriculture, and allot necessary emergency funds therefor. (P.A.)

PROTECTION OF MARKETS

41. Recognizing the necessity of maintaining adequate domestic and export markets for lumber and other forest products, the federal government should re-establish and enlarge services to manufacturers, distributors and consumers in applying the results of research at home and abroad as to commercial and public wood-utilizing methods and practices. (P.A.)

42. It is essential that forest products be given proper consideration in reciprocal tariff arrangements with foreign nations in establishing import and export quotas. (P.A.)

WOOD UTILIZATION

43. The federal government is the largest single owner of timber and the largest single consumer of timber products. The government should establish, and itself and all its agencies adhere to, proper and efficient lumber and timber specifications. (P.A. & F.L.)

44. The federal government should in-

terpret or amend existing laws to make funds readily available for the renewal of homes and for farm building repairs. (R.F.A. & C.A.)

FARM WOOD LANDS

Committee 5

45. All forest holdings in private ownership, both large and small including farm wood lands, should be subject to conservation measures of Article X of the Lumber Code. (P.A., F.L. & C.C.)

46. To secure wholehearted coöperation of farm woodland owners and other small owners of timberland in carrying out Article X of the Lumber Code, the conference recommends that an emergency appropriation or allocation of at least \$200,000 be made available annually to the Federal Agricultural Extension Service for educational purposes. (F.L. or P.A.)

EMERGENCY TIMBER SALVAGE

Committee 6

47. Whenever timber is damaged by fire, wind, insects or other causes to such an extent that its salvage cannot be effected in the usual course of operations, there are consequent severe public losses in tax revenues, employment opportunities and valuable resources. It should be the policy of the federal government to give preferential consideration to such salvage operations in extending financial or other aid, for the development of operating facilities, fire protection, and by other means authorized by law.

COMMITTEE REPORTS

The six conference committees convened on January 22 and devoted the three days prior to the general conference to reviewing of their reports of last October in connection with the reports and recommendations from the ten Divisional Agencies and with additional interested agencies and individuals. Their conclusions and recommendations were submitted to the Conference, in general session, during January 25 and 26, for discussion and action. Herewith are the full reports of the six committees, as amended and adopted by the conference, together with certain resolutions adopted in connection with them.

I. COMMITTEE ON FOREST PRACTICE

C. C. Sheppard, Chairman (J. W. Sewall, *acting*); C. S. Chapman, *Secretary*; B. W. Lakin; D. T. Cushing; H. C. Hornby; R. Zon; E. R. Linn; B. P. Kirkland; E. I. Kotok; E. L. Demmon; E. N. Munns; L. E. Staley; J. W. Watzek; C. S. Cowan; Swift Berry; R. M. Evans; J. J. Farrell; P. R. Camp; S. B. Cope-land; R. A. Colgan; Ward Shepard; Tom Gill; R. D. Garver; Geo. L. Drake; C. J. Buck; Evan Kelley; A. G. Cummer; A. M. Conzet; A. B. Recknagel.

GENERAL STATEMENT OF FOREST PRACTICES APPLICABLE TO ALL FOREST REGIONS OF UNITED STATES

Upon this constitution must be erected divisional and local codes of practice.

REFERENCE KEY

F.L.—Federal Legislation.
F.S.—Forest Service Action.
F.A.—Federal Appropriation.
S.L.—State Legislation.
S.F.—State Appropriation.
C.C.—Change in Code.
L.C.A.—Lumber Code Authority Action.

A.P.—Administration Policy.
S.P.—State Policy.
S.A.—Secretary of Agriculture.
P.A.—Presidential Action.
R.F.A. & C.—Relief Fund Administration
and change in Authorization.
I.A.—Industry Action.

I. SUSTAINED PRODUCTION OF FOREST RESOURCES

A common purpose grounded equally in public welfare and industry welfare dictates that all forest land hereafter to be cut over under the Lumber Code jurisdiction shall be left in favorable condition for regrowth. Conforming to this basic requirement, it is necessary that within the limits of practicability, measures be taken by the operator to safeguard timber and young growing stock from injury by fire and other destructive agencies; during logging operations to prevent damage to young trees; and to provide for restocking the land after logging, if sufficient advance growth is not already present; and where feasible in practice to leave some portion of merchantable timber, usually the less mature trees, as a basis for growth and the next timber crop. The greater the amount of the growing stock retained, the greater the ensuing growth to be expected and the sooner operations can return to the same area.

Specific Measures of Woods Practice

1. Forest Protection During Logging.—Fire protection during and immediately following logging is an indispensable condition for forest regrowth. Responsibility for adequate provision for the control of fires during or immediately following logging operations, and in any way caused by said operations rests upon the said individual operator. He must definitely assume the responsibility of taking practical measures of fire control. This will involve a variety of steps in different logging conditions. It may include slash and snag disposal where necessary, strict rules as to use of fire by employees including smoking in the woods, equipment of logging locomotives and engines with adequate devices for preventing fires, having readily available crews properly equipped to fight fires

upon call, closing operations during exceptionally dry periods, and other precautionary measures. Where a general fire protection system is in effect, it will be expected to correlate with the more intensive system of the individual operator, but it will in no sense replace the protective system of the operator or relieve him of responsibility of protecting his own property to the extent that he has created the hazard. He cannot, however, assume responsibility for fire caused by public carelessness or inadequate public protection.

2. Extension of Coöperation in Protection Against Fire, Insects and Diseases.—To the end that protection against fire and other destructive agencies may be extended rapidly to all forest areas that are now unprotected and that may require protection, the industry will endeavor to secure action on the part of all operating timberland owners in the direction of co-operating with public agencies in systematic fire prevention and suppression and such protective action as may prove desirable and practicable for protection against insects and diseases. The industry will also seek such coöperation on the part of non-operating forest land owners.

3. Conservation of Immature Trees and Young Growth.—So far as practicable all advance growing stock upon the land in the form of young trees of valuable species below merchantable size shall be preserved during logging operations and left without injury for future growth. A certain amount of injury and loss is inevitable in felling trees and skidding logs and in the disposal of slash. Much of the injury and loss sustained in the past can be avoided by conscious care on the part of the woods foreman and his men. The saving of this advance young growth shall be set up by operators as a distinct aim to be kept constantly in view by woods employees.

4. Provision for Restocking the Land

after Cutting.—Since natural reproduction will usually be obtained where partial cutting is practiced, the safest measure to obtain regrowth after logging where conditions permit, is to leave on the logged areas a sufficient number of trees of desirable species to yield a commercial cut at reasonable intervals. Under certain conditions instead of partial cutting, leaving seed trees or groups of seed trees on or adjacent to logged areas may be sufficient to insure a regrowth on the logged-off areas. If there is an insufficient reserve stand or conditions are otherwise adverse and the prospects of securing natural reseeding are uncertain, planting may be desirable.

5. *Partial Cutting or Selective Logging.*—To the extent practicable, partial cutting or selective logging shall be the general standard for local measures of woods practice.

The industry will without delay, making use of studies already made, undertake to determine by regions or by forest types, the extent to which merchantable sizes of timber may wisely be left as part of the forest growing stock. Upon satisfactory determination of such conditions the industry will promptly establish standards of practice looking to the attainment of this objective.

In certain regions or forest types and conditions other methods than selective cutting may be allowed, where conditions do not justify selective cutting.

In order to provide for still greater flexibility and for departure where necessary from the regional or type standards that may be adopted, each individual operator shall be allowed to communicate to the Divisional Administrative Agency the standard and methods which he proposes as best suited in his individual operation to achieve the declared objectives of conservation and sustained production. And if such undertaking is determined by the Divisional Administrative

Agency to equal the regional or type standard of selective logging, or other method of promoting regeneration, it shall be approved in lieu thereof. This in effect allows modification of the regional standard upon submission and approval of specific individual management plans.

6. *Sustained Yield.*—Since the basic purpose of sustained yield is to perpetuate the forest by regrowth after cutting and to maintain in a given local district or on a given forest enough growing stock to provide raw material for industry without interruption, and to safeguard the public welfare, sustained yield is a desirable objective and it shall be adopted as the objective of management for individual tracts or groups of tracts as rapidly as various considerations permit and owners find it advantageous as a matter of orderly business policy. Fire protection, preservation of young growth and partial cutting as outlined in the preceding paragraphs are important steps toward regional and local sustained yield.

7. *Public Coöperation.*—The measure of success ultimately achieved by these undertakings of the Industry, is dependent upon the extent and character of public coöperation in each state.

II. DIVISIONAL ADMINISTRATIVE MACHINERY

The problem is to achieve general administrative uniformity while permitting flexibility within each Division, to permit meeting local and peculiar needs.

We propose that the nature and extent of practicable steps necessary to meet the requirements of the Code for "conservation and sustained production of forest resources" shall be determined for their respective jurisdictions by the several Divisions of forest industry. For this purpose they will use the advisory council of federal and state forestry agencies, administrators of private forest protective

organizations, federal forest experiment stations, and like agencies which have definite responsibility under federal or state laws for forestry or forest protection practice within the several Divisions.

We recommend that in carrying out this proposal, the agencies in charge of the various divisions or sub-divisions establish a Committee on Forest Practice for the division or sub-division, together with committees for the various districts within the division or sub-division as conditions require. It is proposed that each division or sub-division provide such technical and other qualified assistance as may be needed to permit such committees properly to function.

Recognizing the public interest in forest conservation on private lands it is to be expected that the federal government through a representative of the U. S. Forest Service will keep informed of the progress of forest practice in each division or sub-division working in close contact and in coöperation with the supervisory force of the Code agencies.

The Conference approves the representation of state and federal forest services and farm extension services upon Divisional Agencies charged with the application and enforcement of forest practices, by advisory members without voting power.

III. SPECIFIC DIVISIONAL MEASURES OF WOODS PRACTICE

The Committee had before it proposals from the various Divisions. These proposals did not in all instances cover the entire territory of a Division and because of absence of adopted guiding principles lacked some degree of uniformity.

It was recognized that specific changes, if required, in the submitted schedules of forest practice and in administrative machinery can from a sane and practical standpoint only be initiated in the individual Division or Sub-division.

In an attempt, to assist local divisions in conforming to the general principles of forest practice and administrative machinery recommended by this Committee, a review was undertaken of all submitted specific proposals. The suggestions resulting from this review should be submitted to each division and sub-division for their guidance in compiling final recommendations for submission to the Code Authority.

Subcommittees of Committee I examined each of the proposed codes of forest practice submitted to the Conference by the various Divisions and Subdivisions of the Lumber Code Authority. In so doing particular attention was given to the following points:

1. Definiteness
2. Susceptibility to field inspection
3. Adequacy of the suggested measure as to whether it would secure restocking of the land and to keep it continuously productive.
4. Whether pertinent to a Forest Practice Code.
5. Whether requiring additional Government aid.

Upon examination, it was found that none of the proposals submitted measured up to the first four points mentioned.

A detailed statement resulting from this examination has been prepared for submittal to each Division or Subdivision to be acted upon promptly as an aid in recasting the proposed Divisional and Subdivisional codes of forest practice.

It is suggested that each of the Divisions or Subdivisions follow closely the foregoing statement on Sustained Production of Forest Resources as to order of presentation and that, so far as expedient, each Code of Forest Practice incorporate the provisions thereof.

These points covering: Forest protection during logging; coöperation in protection against fire, insects and diseases; conservation of immature trees and young growth and minimum provisions for restocking the

land after cutting are measures which the industrial representatives agree can be carried out without any further public assistance.

Attention is directed to the partial cutting and sustained yield measures which should be specifically considered and acted on by each Division.

Finally, it is urged that all Divisions and Subdivisions meet their needs of local conditions of woods practice by so subdividing their region so as to meet major differences due to varied forest conditions and types.

Subcommittee for the East included: P. R. Camp, *Chairman*, R. M. Evans, H. E. Hornby, E. L. Demmon, A. B. Recknagel.

Subcommittee for the West included: Swift Berry, *Chairman*, C. S. Cowan, Evan Kelly, C. J. Buck, J. W. Watzek, H. W. Cole, B. P. Kirkland, E. I. Kotok.

IV. SUSTAINED YIELD

It is recommended that each Division consider the feasibility and methods of working out sustained yield forest management within its territory.

In order that conservation and sustained production of forest resources may be fostered and encouraged, be it resolved that the Lumber Code Authority be asked to give serious consideration to placing into effect in the various regions section (1) of Article 8 of the Lumber Code by increasing the allotment of those operators who are on a sustained yield basis, or who will place their operations on such a basis.

V. TIMBER LEASES

The problem involved in the relation of leased timberlands and timber rights to Article X of the Lumber Code presents legal complexities beyond the competence of this Committee. We can offer only certain guiding considerations toward the solution of the problem.

As to future leases or timber right contracts, it is clear that Article X should be enforceable both against the owner of the land and the operator of the timber. Other-

wise, fictitious legal devices could be created to evade compliance with Article X, which would be unfair competition against owners observing Article X.

As to present leases, it is clear that the lessees have made financial commitments that may be based on cutting methods not up to code standards. On the other hand, the area of forest land involved in these leases is so great that their exemption from code practice under Article X would constitute a serious damage to the public interest as well as unfair competition to owners forced to observe code practice.

The Committee therefore adopted the following recommendations:

1. That the solution of the problem be sought in part by the extension of Code practice to all timberlands.
2. That as to existing contracts, the minimum silvicultural and protection requirements necessary to permit satisfactory regeneration be observed, enforceable against both the operator and the owner, provided that such requirements shall not include the leaving of extensive volumes of merchantable timber. It is expected that proper constituted authority will make effort to coordinate the interests of land and timber owner to the end that public interest will be protected.
3. That all future contracts and leases to operators coming under the jurisdiction of the Lumber Code Authority shall be based on following Code practice.
4. That appeals from the above recommendations be provided under regular Code procedure.
5. That the Code Authority and the Government give further careful study to this problem regionally to insure fairness to the owners, the lessees, the industry as a whole, and the public.

VI. SUPPLEMENT TO ARTICLE X

In connection with recommendations submitted by Committee I, the following was adopted as an addition to the report of that Committee:

"The Conference recommends that a supplement to Article X of the Lumber Code be promptly submitted to the President, which shall (1) state the general principles of forest practice and sustained yield recommended by the Conference as necessary to accomplish the purposes of the Article; (2) specifically authorize and require the Lumber Code Authority to issue rules and regulations for the application and enforcement of these principles in the same manner and with the same legal effect as in the case of rules and regulations issued under other Articles. The Conference further recommends that the rules and provisions for forest practice in each Code Division or Subdivision, which includes logging operations, be issued in and made legally effective by a separate bulletin of the Lumber Code Authority."

II. COMMITTEE ON PUBLIC TIMBER DISPOSAL AND PUBLIC ACQUISITION

O. M. Butler, *Chairman*; L. F. Kneipp, *Secretary*; D. T. Mason, J. W. Blodgett, W. B. Greeley, J. D. Tenant, R. E. Danaher, A. R. Watzek, Robert Marshall, S. B. Show, E. E. Carter, J. E. Rothery, H. L. Baker, Edmund Secret, R. M. Weyerhaeuser, P. W. Ayres, J. G. McNary.

PUBLIC TIMBER DISPOSAL

The disposal of federal and state timber, to be of the highest use, must contribute to sustained yield production, including the participation therein of private forest lands, through supplying raw material for those private operations which may have the desire but not otherwise the means to sustain ownership and productive management of forest lands. Such a policy may require in any unit of public timber a sustained yield, or an over- or an undercutting program temporarily. More specifically it is recommended that, so far as practicable, and where not in conflict with public interests or objectives, first, all for-

ests owned or controlled by the public be managed on a sustained yield basis, if not already so managed, and second, such public forests be managed in coöperation with the private forests so as to place a maximum of private forests also on a sustained yield basis.

Public timber disposal should further be governed by a policy of extreme conservatism. Such policy should recognize demonstrable demand for the products of public timber, but public timber should be withheld from unnecessary competition in unwilling markets during times of industrial depression and destructive liquidation of private forest resources.

There should be temporary relief legislation authorizing reasonable flexibility in public timber sale contracts, so that purchasers during periods of higher stumpage prices may be given relief from heavy losses through modification of stumpage prices or through cancellation of contracts without unreasonable damages or prejudice.

Mr. Robert Marshall voted against the foregoing statement, which otherwise was adopted without dissent.

REVESTED LANDS OF THE OREGON AND CALIFORNIA RAILROAD LAND GRANT

In Oregon there has been revested in the United States a large share of the original Oregon and California Railroad land grant. The revested forest lands of this grant contain approximately 40 billion feet of timber. The applicable acts of Congress provide in effect that the timber shall be liquidated as promptly as practicable with no regard for practicing sound forest management; thus this timber especially would be in severe competition with private timber for rapid liquidation, excepting for the fact that a temporary executive order is now tending to limit sales. There are three parties interested in the income from the sales of this timber, namely, (a) the several counties in which these

forest lands lie are currently receiving from the United States the equivalent of the 1915 taxes on the lands (this payment is more than consuming the annual income from timber sales); (b) the state of Oregon is to receive a portion of the total income; and (c) the U. S. Reclamation Fund is to receive also a portion of the income. The present destructive basis for management of these lands should be changed to a constructive basis to aid in the main purpose of the wide application of sustained yield management; at the same time there should be due recognition of existing equities; with these objects in mind it is proposed that the following action be taken:

(a) Transfer the entire revested grant to the Forest Service to be managed as national forest land. This transfer should include not only the revested grant lands classified as forest land, but also that classified as agricultural land (which actually is almost entirely forest land or land otherwise not suited to agriculture); to the extent that it is actually agricultural land the Forest Service should take steps to turn it over to homesteaders under the Forest Homestead Act of June 11, 1906.

(b) Continue until June 30, 1936, the present basis of tax compensation to the counties.

(c) Provide that the U. S. Court of Claims shall determine the value of the property as of the date of the forfeiture of the grant, and on the basis of such valuation, without interest to June 30, 1936, determine the respective equities of the counties, of the state of Oregon, and of the United States Reclamation Fund, which will exist on June 30, 1936.

(d) Pay off the equities as determined as of June 30, 1936, with United States bonds at par and bearing a low interest rate.

PUBLIC ACQUISITION OF FOREST LANDS

The committee recommends an aggressive policy of public forest acquisition. It

is an essential part of the joint program of public and industrial agencies for the sustained production of forest resources. The necessity of such a policy is emphasized by accumulating evidence that large areas of forest land now in private ownership can not, for economic reasons, be carried permanently by this form of ownership.

The importance of the public interests to be safeguarded by forest acquisition in such respects as protection of watersheds, control of erosion, and preservation of recreational values is fully recognized. The Conference does not attempt to deal with these features of a national policy. To carry out its purpose of co-ordinating public and private action for effective accomplishment of the aims of Article X of the Lumber Code, the Conference recommends that the primary objective of public forest acquisition be the same as in the disposal of the timber now in public ownership; namely, to restore and sustain desirable regional growing stocks of timber, to maintain the permanent yield of forest products, and to assure permanency to forest industries, communities and employment.

To this end, public forest acquisitions should be designed—as far as practicable and with due consideration of other public interests—to promote the maximum development of sustained yield forest management on both public and private lands. This should be sought through public acquisition in areas where, through the forms of coöperation recommended in connection with the disposal of public timber, sustained yield can be brought about on economic units comprising both public and private holdings.

The Conference endorses the recommendation on forest acquisition contained in the Copeland Report of the Forest Service, with a further recommendation that this program should include the acquisition of not less than 150 billion feet of standing timber.

It is recommended that the foregoing plan of acquisition be made operative immediately and that not less than three-fourths of the land acquisition program be completed within the first ten years and that if possible all of the stumpage acquisition program be completed within five years.

The acquisition of forest lands, to fully accomplish its public objectives, should be accompanied by an adequate financial provision for the protection, development and management of the acquired lands.

In the event the nation's financial status does not permit of cash appropriations adequate to carry out the foregoing program, the use of bonds in payment for the lands to be acquired is strongly recommended.

With the objective of stabilizing county revenues in connection with the extension and administration of the national forests, it is recommended that the Secretary of Agriculture designate a committee representing all interests affected to study the problem and submit its findings and recommendations to the Secretary.

FOREST LAND EXCHANGES

To facilitate the blocking of both public and private lands and the extension of national forests, in the interest of better forest management, federal laws should in the public interest be amended to remove the existing limitation with respect to state boundaries upon land and timber exchanges, and should also be made applicable to private lands outside of the national forests.

As a corollary to the above proposal the committee desires to call attention to Section 7 of the Act of June 7, 1924, known as the Clarke-McNary Act, which authorizes the Secretary of Agriculture to accept donations of lands chiefly valuable for national forest purposes, subject to reservations by the donors of tim-

ber and/or other rights for periods not exceeding twenty years. It is the belief of the committee that there are many sections of the country where this provision effectively could be employed in furtherance of both public and private objectives provided that the Secretary of Agriculture could, in his discretion, pay the accrued and unpaid taxes on the donated lands from public funds. The committee recommends that Section 7 of the Act approved June 7, 1924, be so amended as to authorize the Secretary of Agriculture in his discretion to accept donations of lands chiefly valuable for national forest purposes from private owners, counties and states, subject to the payment by the United States of such taxes as might be due and outstanding on such lands.

It is also the belief of the committee that states and counties might appropriately adopt a similar policy or procedure in relation to lands within the boundaries which the owners thereof might be willing to donate for public forest purposes.

III. COMMITTEE ON FOREST TAXATION AND FOREST CREDITS

George F. Jewett, *Chairman*; A. G. T. Moore, *Secretary*; W. DuB. Brookings (representing T. G. Wolford); L. F. Cronemiller; S. T. Dana; R. C. Hall; Henry E. Hardtner; B. F. Kirkland; R. E. Marsh; W. N. Sparhawk; R. E. Benedict; J. M. Bush; H. H. Chapman; George N. Ostrander; J. H. Pratt.

Sub-Committee on Taxation.—S. T. Dana, *Chairman*; R. C. Hall, Henry E. Hardtner.

Sub-Committee on Forest Credits.—A. G. T. Moore, *Chairman*; S. R. Black, B. P. Kirkland, W. N. Sparhawk.

REPORT ON FOREST CREDITS

The relation of forest credits to the problem of reforestation and timber con-

servation may roughly be set forth as follows:

First. In some areas the forests have been largely depleted of growing stock. On numerous properties money investments will be necessary to pay taxes and the cost of administration of fire protection, and permit the owners to forego income from the forests while they are being rebuilt to a condition that will permit continuance of operation.

Second. In some areas there is a temporary surplus of mature timber. Here financial pressure and other influences are leading to hasty and wasteful liquidation of the forests. Credit at economical costs appears fundamental to any program looking to the orderly marketing of the surplus of mature timber under private management in a way to preserve the productivity of those forests on a sustained yield basis.

In late years a strong tendency has manifested itself toward the development of lending institutions adapted to special requirements. Many examples such as insurance companies, mutual-savings banks and building and loan associations come readily in mind. These have been developed chiefly to serve the needs of persons wishing to save and lend capital, although the building and loan associations originally had an equal aim of serving borrowers. Of more recent development are institutions organized specifically to serve needs of borrowers. These include smaller institutions such as credit unions, but the more outstanding examples are the federal land banks, the intermediate credit banks, and the home loan banks.

A fundamental aim of the federal land bank system is to promote effective use, in the public interest, of the agricultural land resources of the country and to promote satisfactory social conditions. Effective use of forest lands must be considered

closely related to this purpose. A further important element in this relationship is the fact that much submarginal agricultural land may be diverted to forest use. Facilitating the use of such land for forestry purposes is expected to strengthen agriculture and presumably the security behind farm loans.

Indeed the public interest generally is subserved in any measures taken towards promoting the orderly marketing of standing timber, the reforesting of deforested areas and the ultimate placing of the entire industry on a sustained yield basis at the earliest possible moment. In these accomplishments, the lumber industry can maintain its place as one of the greatest employers of labor, and augment capital assets and taxable wealth to the Nation. By way of illustrating the intense degree to which the public interest is interlocked with the problem of maintaining our forests, we must take into account such facts as the influence of trees on rainfall, erosion, the fact that trees on mountain slopes conserve snows for the benefit of irrigation, water power, etc., in areas far distant from the actual forests. These and other phases of public interest well understood within the industry and among the foresters, reveal a degree of public interest which fully warrants federal aid in forest credits, so essential to any well-founded program evolved to promote reforestation and timber conservation.

In any given case, such credit should be extended for the full length of time necessary to accomplish the purpose, with proper rates of amortization as well as low rate of interest.

A PERMANENT FOREST CREDIT SET UP¹

The purposes for which loans might be granted would include the following:

1. Such measures as are designed to improve the productivity of organized for-

¹See note at end of report.

est properties, including restricting cut to permit building up growing stock, fire protection, annual tax payments and necessary silvicultural measures. (When loans are made for these purposes on immature forests or on forests the cutting of which should for any reason be deferred, arrangements may be made to advance the loans in annual installments over periods as long as 20 years. No annual installment should exceed the amount required to meet costs for that year.)

2. To assist in the orderly marketing of timber already mature or, in exceptional cases, to withhold from the market timber which it would be economically injurious to throw on an overburdened market. This will include forest protection from fire, insects and disease; improvements in forest utilization, taxes, administrative costs and retirement of existing indebtedness.

3. To assist in acquiring tracts and assembling them into units of economic size and location for continuous-yield operations.

4. To assist in constructing permanent transportation systems within the confines of forest properties concerned and to connect them with common-carrier transportation facilities.

5. To assist such states as may adopt a sound method of forest taxation which involves state financing.

6. For the special purpose of taking care of these needs during the present emergency and pending the establishment of a permanent forest credit set up, during which period the lumber industry will be undergoing readjustment and reorganization under the N.R.A. program, we recommend that Congress appropriate, as a revolving fund, \$200,000,000.00 to constitute a special fund from which the appropriate agency may lend to states and/or individuals for these purposes.

REPORT ON FOREST TAXATION

Adequate fulfillment of the obligation assumed by the Lumber and Timber Products Industries under Article X of the Lumber Code to promote forest conservation of privately owned forest resources is seriously hampered by the burden imposed under the existing system of state and local taxation. This burden is forcing the premature cutting of merchantable timber, is preventing the reforestation of cut-over lands, and in general is discouraging the practice of conservative forest management.

Since state and local taxation are not subject to direct federal control, this situation can be remedied only by state action. The conservation of forests, on the other hand, is a national problem, and in Article X of the code the federal government definitely recognizes its share of the responsibility for the solution of this problem. Accordingly, the federal government should take the initiative in promoting remedial action by the states in the taxation of forest properties.

In view of these facts, the Conference recommends that the President of the United States be asked to lay before the governors of the states the vital part which the solution of the forest tax problem plays in the national forestry policy and the recovery program as applied to the forest industries. This Conference further recommends that the President impress upon the governors the immediate need for changing existing state taxation of mature and young timber to some system providing for the payment of such taxes when the owner is best able to do so, namely, at the time the timber is harvested. It is further recommended that the joint committee to be appointed to complete the work of the Conference, work out a more detailed taxation program for recommendation to the President. The President should urge that each governor appoint a committee or an

appropriate agency to consider ways and means of improving the present situation with respect to the taxation of forest properties. Provision should be made for regional conferences between these agencies to promote such uniformity of action by forest regions as may be found practicable. The action to be taken by these agencies should be the framing and sponsoring of legislation designed to accomplish the ends enumerated below:

1. Reduction of the total burden of taxation on real estate, without curtailment of necessary public functions. Among measures which could appropriately be considered under this head are the following:

(a) State assumption of functions of general concern, and partial state support of services which cannot be handled adequately by local governments. The resulting increases in state expenditure should preferably be financed by some other form of taxation than the property tax.

(b) Reduction in the number of local units of government through abolition of unnecessary units and consolidation of those which are too small to function economically under modern conditions.

(c) The disorganization of local government in certain areas of sparse population with little promise of agricultural or industrial development, and the zoning of these areas in such a way as to assure their use for the purposes to which they are physically and economically best adapted.

(d) The more effective and economical administration of local government through the greater use of trained administrators and better financial practices, to be promoted by a larger degree of state supervision. These might go so far as to include specific limitations on the amount of revenue to be raised under the property tax.

2. Distribution of the burden of taxation among property owners with greater equity, to be accomplished by improvements in tax administration, particularly as to methods of assessment and collection. Among the measures to be considered under this head are the following:

(a) The centralization of assessment in jurisdictions large enough to maintain an organization of full time, well paid, expert assessors appointed and retained under the merit system.

(b) Introduction of the most approved methods for arriving at sound assessment of taxable property, such as use of maps, surveys, and sales data. Full consideration should be given to income-producing capacity as a measure of value.

(c) Efficient collection procedure vigorously enforced, with proper allowance for emergency conditions but without inviting tax delinquency through haphazard and lenient procedure.

3. Adoption of a method of forest taxation which will give appropriate treatment to forest properties the conservative management of which requires a period of income deferment. This method should take into consideration, in separate categories if it seems desirable, both old growth, mature timber and second growth or cut-over forest lands. The following measures may be considered under this head:

(a) The three forest tax plans which have been proposed by the Forest Service, namely, the adjusted property tax, the deferred timber tax, and the differential timber tax.

(b) Some form of the yield tax, which has been widely advocated as a method particularly applicable to second growth or cut-over forest lands.

(c) Any other plans designed to accomplish the same general purposes.

Adjustment of existing methods of taxation is particularly important during the

period usually necessary for transition from the present irregular forests to forests managed on an annual sustained yield basis. Given just and effective administration of the tax system, the practice of sustained yield forest management constitutes the most important single measure in placing forests on an equality with other property.

The Conference also recommends that the President be asked to include in the message to the governors an offer of federal coöperation through making available the assistance of qualified specialists in presenting the results of the Forest Service study of forest taxation, and in developing legislation applicable to specific states. To meet the demand which this offer would invite, it is essential that provision be made for an adequately financed forest taxation unit in the Forest Service.

In connection with these recommendations, the Conference calls attention to the fact that the measures suggested, while particularly urgent in connection with the conservative management of forest lands, are of fundamental importance to all owners of real property and to the public in general.

IV. COMMITTEE ON COÖPERATIVE PUBLIC EXPENDITURES

W. G. Howard, *Chairman*; Franklin Reed, *Secretary*; John Raine; C. F. Speh; S. R. Black; R. B. Robertson (represented by W. J. Damtoft); E. O. Siecke; R. B. Goodman; Axel Oxholm; John Hinman (represented by J. E. Rothery); Fred Morrell; C. P. Winslow; G. R. Hogarth (represented by S. G. Fontana); W. F. Ramsdell.

I. FIRE CONTROL

Adequate stable fire protection is a prerequisite to the effectiveness of any code of forest practice. It demands two

types of activities. First, nation wide homogeneous, systematic extensive fire detection and suppression regardless of land ownership to preserve the broader forest values from destruction, together with well balanced program aiming at the prevention of fire; and, second, intensive protection of restricted areas to protect the substantial investments incident to efficient utilization of the land resource and to continuous forest production.

The first type is essentially a public undertaking to be financed by federal, state and local governments. Such a blanket system shall be coöordinated between the states by the federal government and should be assured all forest owners. The intensity of private fire protective standards shall be contingent upon the adequacy of public fire protection aid.

Many of the benefits of protecting private forest land from fire inure to the public and not to the private owner as such, as for example, watershed improvement, soil and game protection, recreation, increased national wealth, etc. Fires frequently arise from sources over which the owner has no control. Protective systems can be organized and administered efficiently and economically only for large contiguous units and on a state wide basis. The responsibility of the federal and of state governments is inescapable and their leadership is essential to success.

Under the forest fire coöoperative programs of the Weeks and the Clarke-McNary acts systematic protection of varying intensity has been extended by the states to include about 225 million acres of the 420 million acres of state and privately owned land classed as in need of protection from forest fires. Within the protected area only slightly more than 1 per cent of the productive forest land burned over in the five year period, 1926-1930, as contrasted with 20 per cent within the unprotected area.

These results which were obtained under a plan whereby the federal government has shared the cost with the states and private owners roughly upon a 25-75 per cent basis indicate the effectiveness of organized public fire control, and emphasize the need of its extension. It is the opinion of this Committee that it should be extended to the point where the federal government shall contribute for forest fire protection purposes 50 per cent of the total amount required, the rest of the expenses being borne by the states and their political subdivisions and/or private land owners. In no state, however, should the federal contribution exceed the combined contribution of the states and their political subdivisions and the private owners.

In addition to provisions for coöperative protection on state and private lands, it is urgently recommended that suitable federal appropriations be made to provide adequate protection both for forest lands now in federal ownership and for those to be acquired under the proposed enlarged acquisition programs.

Under existing authorization Congress appropriated under the Clarke-McNary Act, \$1,587,513 for 1934. Of this amount 25 per cent was impounded. It is especially urged at this time that the impounded fund be released or replaced from other sources to prevent the breakdown of forest fire protection facilities this fiscal year. In view of developments under Article X of the lumber and timber products code, it is also essential not only that the entire authorization of \$2,500,000 of the Clarke-McNary Act be appropriated and made available for the fiscal year 1935 but also for subsequent years appropriations should be further increased as needed to \$10,000,000 to make the fire control requirements of the code effective.

II. CONTROL OF FOREST INSECTS AND DISEASES

A. Protection Against Forest Diseases

1. *Research.*—Diseases that attack forest trees and forest products injure the interests of both producers and consumers. They are disturbing not only because of the aggregate losses which they cause, but because of the uncertainty they introduce into production and the effect they have in lowering the dependability of the products in use. The uncertainties arising from this source must be abated so far as possible if the industry is to be able to carry out its conservation commitments with assurance that its program will not be wrecked by unpredictable disease losses. To control such damage requires prompt and dependably maintained action on the part of specialized forest pathologists. Only the federal government, and to some extent the states, are able to maintain trained personnel for such work. They are in the best position to initiate action by reason of generally present complications due to diversity of ownership. Effective dealing with these situations calls for coöperation between federal government, states and private land owners.

Research on native diseases: Diseases that are native, and such foreign diseases as are already long-established, cause losses that are continuous and interfere both with timber growing and timber utilization. Because of the difficult character of the ground and the size of the trees, direct control measures in most cases are too difficult or expensive to apply. Modifications of forest management and utilization procedure are the only practicable methods for dealing with such diseases. To work out such indirect control methods, long continued research is necessary, involving study of the influence on the disease of all the modifiable environmental factors. Similar specialized research against the fungi that de-

stroy wood either in the forest or in use is required to insure the consumer maximum utility of the product, and to keep forest products from losing part of the market that properly belongs to them. The Committee recommends that the federal government continue its appropriation of funds for research on these native or established diseases, gradually increasing it by 1938 to the \$250,000 which the McSweeney-McNary Act authorized for this purpose. It is also desirable that those states having large forest industries should interest themselves to a greater extent in research on the forest diseases of most local importance.

Research on recently introduced diseases: Introduced diseases are potentially a more serious menace even than the native diseases, to the stability and continuity of the wood-producing industries. The chestnut blight affords a vivid example of the capacity of such diseases to wipe out a timber species. Such diseases as the Douglas fir cankers, the Western yellow pine blight, the pine canker and the beech disease might cause total destruction of these prominent timber trees over wide areas. Such introduced or epidemic diseases must be studied promptly and continuously so that any possible control measures, such as quarantine or eradication, may be intelligently applied at the earliest possible date. Again, only the federal government and to a limited extent the state, are in a position to maintain a trained personnel and to overcome the difficulties due to diversity of ownership and state and national lines. The Committee notes with regret that the item under which this research is maintained by the Division of Forest Pathology in the Bureau of Plant Industry has been cut out in the Budget for the fiscal year 1935. The Committee urges that the federal government continue its support for this appropriation, which is outside of the McSweeney-McNary Act. This appropriation is hardly adequate in amount, but

its obliteration would leave the timber interests of the country without protection against this very dangerous type of disease. For adequate defense against the original entrance of new epidemic diseases from abroad, the Committee urges that specialists be sent to other continents to determine through observation and experimentation what foreign diseases must be guarded against and what measures are necessary for their exclusion.

Service: Successful application of methods of avoiding loss from native or established diseases requires the services of technical men to help organize and direct the activities. As fast as research supplies the necessary basic knowledge, a service force with both pathology and woods experience should be developed to assist timberland owners in adapting disease control measures to local field and economic conditions.

2. Control of White Pine Blister Rust: The inauguration of the Emergency CCC and NRA relief programs presented an opportunity for going organizations with trained personnel and definite work programs to be of national service in making effective use of the facilities provided through these emergency unemployment relief programs. Because the blister rust control unit was an established and well-trained organization, it was able to contribute effectively to the success of these emergency programs. This work, as well as that previously done, with regular federal appropriations and the contributed funds of states, organizations and individuals will be lost by natural reversions of the control areas to their original Ribes conditions if they are not kept free of these plants through systematic follow-up work. In addition, there are several million acres of valuable pine land that must yet be put under control. These constitute a long-time job requiring a well-trained and experienced supervisory personnel.

The Bureau of the Budget eliminated

the blister rust language and all of the regular funds for this item in the 1935 budget, presumably because emergency funds had been allotted for the work. This action is directly opposed to the best interests of the blister rust control program. The fact that large sums of emergency money are available for the work for short periods increases rather than decreases the need for competent and adequate supervision, if worthwhile results are to be accomplished. Apparently this was not understood in the Budget proposal to eliminate the item and therefore no provision was made for maintaining the trained personnel necessary for the effective prosecution of this work. The rust is widely established in this country. Its threat is ever present over the white pine producing lands and constant and persistent effort is absolutely essential to maintain its control on these areas. Without adequate and well planned follow-up work a great share of the initial investment so far made in control will be lost.

The specific need is maintenance of the blister rust control language in the 1935 and subsequent Appropriation Bills as in the past with sufficient funds to assure effective operation of the trained personnel necessary to give effective leadership and supervision to the work.

Amount needed—\$375,233 (amount of the last appropriation).

B. Protection Against Forest Insects

Forest areas suffer heavy attacks by insects. To eradicate such attacks in their incipiency requires prompt action under direction of entomologists. Only the federal government, and to some extent the states, are able to maintain trained personnel for such work. They are in the best position to initiate action by reason of generally present complications due to diversity of ownership. Effective dealing with these situations calls for coöperation between the federal government, states and private land owners on principles

similar to those covering forest fire protection.

The work logically divides into four main classes: research, survey, local control and control of attacks of epidemic character.

Control of insect attacks that have reached epidemic character call for emergency appropriations and special emergency forces. These can best be directed by federal agencies, because of the infrequent occurrence of such attacks in any given state and the interstate aspects of such attacks.

It is believed that the survey phase of insect control should be financed by the public with the federal government supplying the major portion with such assistance as can be received from the states. In actual control work on private land, the owner should usually contribute to or pay the entire cost of the work, with supervision furnished by the public. It is estimated that approximately \$500,000 of federal appropriation is needed annually for work of this kind.

III. COÖPERATIVE ECONOMIC SURVEYS

The present forest survey should be hastened, and be extended to include determination of logical sustained yield units, with supporting facts as to classes of timber, protection and development needs, growth potentialities, and analysis of ownership status.

For this purpose a minimum of \$500,000 a year should be made available until the survey is completed. Thereafter adequate provision should be made for keeping the survey data up to date.

IV. FOREST RESEARCH

The federal government should undertake an immediate and continued expansion of its forest research adequately to provide the facts and information necessary to the attainment of the declared

objectives of the Code (Article X) as are otherwise unavailable.

The kinds of research specifically recommended for expansion fall into four groups:

The first underlies the perpetuation of the forest resource and its sustained production. It covers such things as how to cut timber to insure the perpetuation of the forest, how to obtain maximum yields of the best or desired quality of timber, and how to protect against fire, including necessary weather and climatic studies.

The second deals with utilization of the major product—wood—in such a way as to insure reduction of waste, lowering the costs, maximum returns from timber growing, and the highest service to the consumer, and thus assist the retention and development of stable and profitable markets for forest products.

The third deals with a wide range of economic and social problems which underlie sustained production and utilization and the whole question of forest land use.

The fourth relates to necessary studies including coöperative action with states, to provide the essentials regarding forest land in connection with general land classification. This is in addition to the "forest survey" which is covered elsewhere in this report.

It is recommended that beginning with the fiscal year 1935, the present scope and magnitude of this federal research be annually progressively increased to a basis of \$2,700,000 by 1938, and thereafter by \$325,000 annually until 1944. This is in accord with the provisions arrived at through the exhaustive studies embodied in the Copeland Report, which has the approval of the Forest Service and the Secretary of Agriculture.

It is further urged that funds impounded from appropriations available for research be immediately released or replaced from other sources, to permit

this important work to be carried forward during the rest of the fiscal year 1934.

V. FOREST EXTENSION

The extension of knowledge regarding timber growing, logging, and wood manufacture and use, acquired through research activities and experience, is a public function and should be placed on the same basis as that of knowledge regarding farm crop and animal production.

In conformity with the general rule in federal aid projects, the federal government should match on a dollar-for-dollar basis the forest-extension contributions of states and of political subdivisions thereof whose forest-extension activities constitute part of a statewide plan subject to control of state authorities.

Where because of lack of sufficient state support to the project or for other reasons direct federal extension work is necessary to realize on expenditures in research work, the federal government should in addition to the matching of state funds make provision for such direct extension activities as are necessary to inform the owners of forest lands as to the results of its research work and forestry practices.

The federal contribution to farm woodlands extension is now limited by the Clarke-McNary Act to \$100,000 annually. This authorization should be increased to \$250,000. An additional authorization of \$375,000 is required to meet the needs of other private owners. These additional funds would be expended either through State agencies or directly by the federal government.

Recognizing the necessity of maintaining adequate domestic and export markets for lumber and other forest products, it is further recommended:

(1) The reestablishment and extension of federal services to manufacturers, distributors, specifiers and consumers, in

translating and applying the results of research both at home and abroad to commercial and public wood utilization practices.

(2) That forest products be given proper consideration in connection with the reciprocal tariff arrangements with foreign nations in establishing import and export quotas, etc.

VI. INVESTIGATION OF FOREST PRACTICE IN EUROPE

Article X of the Code of Fair Competition for the Lumber and Timber Products Industries promises to become a new Code all by itself:—a Code of Fair Practice for Forest Owners. The purpose of this conference on Article X is to devise practicable ways and means for bringing about the conservation and sustained production of forest resources, not only on those forest lands which happen to be owned by lumber manufacturers, but on all privately owned forest lands of the country, whether the holdings be large or small, and whether or not their owners are producers of lumber and allied products, pulp and paper, or naval stores, or are non-producing investors who sell or expect to sell their merchantable timber as a raw material to one or more of the wood using industries. The undertaking is a first step toward a system of "Gemischte Wirtschaftliche Betriebe" as are working out so successfully in certain other countries, and which maintain the proper balance between protection of the public interests and preservation of private initiative. Sweden, after 30 years of constructive effort largely at the initiative of forest industry, has brought her whole forest area under satisfactory sustained yield management. Seventy-five per cent of 60 odd million acres are privately owned. Finland also has made marked progress on similar lines. Germany has been working out a system of public forest credits to insure the con-

tinued sustained yield management of her large private forests estates whose security was jeopardized by the abolition of the law of entail, and has also been perfecting since the war, a forest extension service for the small farm woodlot owner, the cost of which is covered by the latter and the practical results of which appear in many particulars to be much better than our own.

The experiences and accomplishments of these three countries contain much of unmeasurable value to ourselves in our undertaking. We should understand intimately what they have found to be practicable under their conditions in order to know how much of it is adaptable to our own. For this purpose the position of forester with the Foreign Service of the U. S. Department of Agriculture should be restored immediately.

To finance this undertaking will cost about \$10,000 a year and require special authorization from the President for the allocation of funds from some of the emergency relief appropriations. In taking this action, provision should also be made for the dissemination of the information thus produced.

VII. FEDERAL USE OF FOREST PRODUCTS

The Government of the United States is the largest single owner of timber. It is the largest single consumer of timber products. Its example in purchasing specifications is widely followed. The government should establish and itself, in all its agencies, adhere to a sound program for proper and efficient specifications, thereby encouraging efficient wood using practices.

VIII. FURTHER ENCOURAGEMENT OF WOOD UTILIZATION

Maintenance of productivity of forest land by owners and timber operators depends on a stable outlet for forest products. Due to inability of farm owners

and small home owners to finance needed new construction and repair, the building industry, and consequently the outlet for forest materials, has fallen off alarmingly.

To permit immediate resumption of needed construction, there should be interpretation and application of existing law, or additional law if required, to make funds readily available for renewal of home and farm building repair.

V. COMMITTEE ON FARM WOODLANDS

Fred Brenckman, *Chairman*; A. B. Recknagel, *Secretary*; K. E. Barraclough, P. R. Camp, G. H. Collingwood, J. A. Cope, R. W. Graeber, D. E. Lauderburn, G. E. Marshall, W. R. Ogg, H. A. Reynolds and W. K. Williams.

Since the acceptance of the preliminary report of the Committee on Farm Woodlands at the October Conference, the proposals made in that report have been submitted to all the Divisional Lumber Code Authorities for consideration and amendments. Such amendments and new proposals were brought before the Committee and after further deliberation these proposals have been coördinated, and the following are the recommendations of the Committee:

1. That to conserve our timber resources, all forest lands in private ownership, both large and small, including farm woodlands shall be subject to the conservation measures under Article X of the Lumber Code.

2. That any conservation regulation under Article X shall apply only to operations where the products therefrom are offered for sale and/or used in the manufacture of commodities for sale. Furthermore, nothing in Article X shall be interpreted as contravening the last sentence of Section 5 of the Industrial Recovery Act, which reads as follows:

"(a) Nothing in this Act, and no regulation thereunder, shall prevent an

individual from pursuing the vocation of manual labor and selling or trading the products thereof; nor shall anything in this Act, or regulation thereunder, prevent anyone from marketing or trading the produce of his farm."

3. That the farm woodland owners shall be represented on the Forest Practice Committee of the Lumber Code Authority; also on the Several Divisional Forest Practice Committees in proportion to the importance of the farm timber holdings in the several divisions.

4. That for the purpose of administering the provisions set up under Article X of the Code, the Lumber Code Authority under its various Divisional Agencies shall organize Local Forest Practice Boards. These Boards shall prepare rules for forest protection practices and timber cutting requirements applicable to conditions of their respective regions, which shall not be less than the minimum requirements to be set up by the Divisional Agency, and subject to the approval of the said Divisional Agency.

5. That in the personnel of the Local Forest Practice Boards the farm woodland owners and other small timber owners shall be given representation in proportion to the importance of their timber holdings in the respective regions, with representation of the State Forest Service and of the State Agricultural Extension Service as technical advisers.

6. That the Local Forest Practice Boards shall make provisions applicable to the conditions of their respective regions to assist the Industry and Timber owners in putting into operation the protection and cutting practices provided under Article X.

7. That the representatives of farm woodland owners as members of the Forest Practice Committees and Boards as specified in Sections three (3) and five (5) of this report shall be selected from recommendations submitted by farm organizations.

8. That an amendment be added under Article III (c) of the Code providing: That the Lumber Code Authority may declare it an unfair practice for Code Industries to buy timber products cut from privately owned lands unless accompanied by a certificate indicating that these products have been cut in compliance with provisions and regulations under Article X.

9. That any action necessary to make these recommendations effective shall be taken by the Lumber Code Authority.

Resolution Presented by Mr. C. C. Shepard and adopted after approval of Committee V Report:

Recognizing that the success of securing the wholehearted coöperation of farm woodland owners and other small owners of timberland in carrying out the provisions of Article X of the National Lumber Code will depend upon the educational program relative to the conservation and forest practice measures under the Code, and the benefits that these timber owners will receive therefrom

And further recognizing that the Federal Agricultural Extension Service with its system of extension education is prepared quickly and efficiently to conduct this educational program

Therefore: The Conference recommends to the President of the United States that an emergency appropriation or allocation of at least \$200,000 be made available annually to the Federal Agricultural Extension Service for the above purpose, and to be spent either in coöperation with the states without offset (on the part of the states) or directly by the Federal Agricultural Extension Service.

VI. COMMITTEE ON EMERGENCY TIMBER SALVAGE

J. W. Watzek, *Chairman*; T. T. Munger, *Secretary*; J. W. Blodgett, C. J. Buck, William B. Greeley, L. S. Cronemiller and Axel Oxholm.

Whenever timber is damaged by fire, wind, insects or other cause to such an extent that its salvage cannot reasonably be effected in the usual course of operation, and therefore the community and the public will suffer severe loss of tax revenues, employment opportunities and a valuable natural resource unless a comprehensive plan for its rapid salvage can be developed, it is recognized that in the interest of conservation and public welfare an emergency exists which must be accorded special treatment.

In such cases it shall be the duty of Lumber Code Authority to make available to the damaged timber a production allocation sufficient to permit it to be marketed with minimum loss, and to take such other steps as are within its power to facilitate an adequate salvage operation.

It shall be the policy of the federal government, through its various agencies, to give preferential consideration to such salvage operations in extending financial or other aid for the development of operating facilities, additional fire protection or in any other manner authorized by law, and to enlist the coöperation of state and other local agencies.

In the past two years forest fires in northwestern Oregon have devastated an area of 325,000 acres carrying a stand of 13 billion feet of valuable fir timber. Its immediate salvage is imperative to prevent loss of this vast resource and of the great public benefits of employment and tax revenues which will result from its operation. This catastrophe we regard as constituting a national emergency problem of a type which warrants and necessitates special treatment by both public and industry agencies.

JOINT COMMITTEE

(To carry on the work of the conference)

David T. Mason, *Chairman*; B. P. Kirkland, *Secretary* (with William L. Hall acting as secretary and carrying on

with his duties as secretary of the conference); *Industry Representatives*: William B. Greeley (represented by C. S. Chapman), David T. Mason, George F. Jewett, A. G. T. Moore, A. B. Recknagel (represented by E. R. Linn, National Hardwood Institute). *Public Representatives*: E. H. Clapp, B. P. Kirkland, W. G. Howard, O. M. Butler and Ward Shepard.

At the close of the session on January 26 the Conference provided that the Secretary of Agriculture and the Chairman of the Lumber Code Authority (Mr. John D. Tennant) jointly appoint a committee, consisting of an equal number of public and industry representatives, whose duty it should be to take promptly such action as might be appropriate to give effect to the recommendations of the Conference.

It was further provided that the Conference itself should not definitely disband, but rather should consider itself in recess, to be reconvened on recommendation of the joint committee upon the approval of the Secretary of Agriculture.

The compilation of this report is the work of the Joint Committee. Certain portions were prepared by it direct, viz. the Introduction; the Digest of Conference Recommendations; and the chart, which diagrammatically points out sustained yield management as the solution of the forest problem. The balance was prepared under the Committee's direction by William L. Hall in coöperation with the Editor of the JOURNAL OF FORESTRY.

THE JOINT COMMITTEE'S TAXATION PROGRAM

The conference, in adopting the report of Committee III, charged the Joint Committee with the task of working out a more detailed taxation program for recommendation to the President for prompt adoption in those states where the need is most acute. Its proposed program is as follows:

Forest taxation occupied a major place

in the work of the Conference. It was recognized that improvement in the existing system of state and local taxation is an essential part of a program of forest conservation. The need for federal leadership in bringing about such improvement was stressed. The following statement is from the Conference report:

"Adequate fulfillment of the obligation assumed by the Lumber and Timber Products Industries under Article 10 of the Lumber Code to promote forest conservation of privately owned forest resources is seriously hampered by the burden imposed under the existing system of state and local taxation. This burden is forcing the premature cutting of merchantable timber, is preventing the reforestation of cut-over lands, and in general is discouraging the practice of conservative forest management.

"Since state and local taxation are not subject to direct federal control, this situation can be remedied only by state action. The conservation of forests, on the other hand, is a national problem, and in Article 10 of the Code the federal government definitely recognizes its share of the responsibility for the solution of this problem. Accordingly, the federal government should take the initiative in promoting remedial action by the states in the taxation of forest properties."

The Conference also recommended the maintenance of a Forest Taxation unit in the Forest Service.

The Conference outlined the fundamental reforms which the forest tax situation requires as follows:

1. Reduction of the total burden of taxation on real estate, in part through more economical administration of local governments without, however, curtailing necessary public functions.

2. Distribution of the burden of taxation with greater equity through improved tax administration, particularly as to methods of assessment and collection.

3. Adoption of a method of forest taxation which will give appropriate treatment to forest properties the conservative management of which requires a period of income deferment.

Various measures were suggested in the Conference report for consideration as means of attaining the above fundamental reforms.

The Conference proposed immediate action as follows:

"In view of these facts, the Conference recommends that the President of the United States be asked to lay before the governors of the states the vital part which the solution of the forest tax problem plays in the national forestry policy and the recovery program as applied to the forest industries. This Conference further recommends that the President impress upon the governors the immediate need for changing existing states taxation of mature and young timber to some system providing for the payment of such taxes when the owner is best able to do so, namely, at the time the timber is harvested."

The Conference charged the Joint Committee with the task of working out a more detailed taxation program for recommendation to the President for prompt adoption in the states where the need is most acute.

It is recognized that no one plan of forest taxation is likely to fit the conditions in every state. Several plans for adjusting the burden of taxation to deferment of income were considered, among which are the adjusted property tax, the deferred timber tax, the differential timber tax and the yield tax. Of these plans it is believed that the "deferred timber tax," which is one of three plans suggested by the Forest Service, comes the closest to meeting the requirement for immediate legislation. This plan is a modification of the property tax, and its essential features are as follows:

(1) Segregation of the total assessed value of forest property into land value and timber value, and payment of the annual property tax on land value in the ordinary manner.

(2) Deferment of property tax payments on timber value until income is realized through the cutting or sale of timber and other forest products.

(3) Payment of taxes on timber value due the local units of government from a timber tax fund to be provided by the state.

(4) Repayment to the state timber tax fund in years when income from timber is realized of deferred timber taxes, accumulated without interest, together with the timber tax of the current year; total repayment within any one year limited to a fixed per cent of the stumpage value of the forest products cut or sold in that year.

(5) In case of extraordinary loss through fire or other causes, reduction of the deferred timber tax carried forward from the preceding year to the assessed value of the timber in the current year.

(6) Treatment of all forest property in one ownership in a tax billing district as a unit for the purpose of administering (2), (4) and (5).

It is therefore recommended that the deferred timber tax plan be submitted to the governors of the states as a definite measure especially suitable for adoption where standing timber is an important element in the economic situation.

It is also recommended that the federal government, as an emergency measure, facilitate the adoption of the deferred timber tax plan by offering to states where it is adopted, loans sufficient to establish the state timber tax fund and maintain it through a period of five years. These loans should be repaid gradually as deferred timber taxes paid into the state timber tax fund exceed the necessary working balance, with a final limit for

repayment of ten to twenty years. Such aid could well be limited to states which undertake to exercise sufficient control over the assessment process to prevent excessive and grossly inequitable assessment of forest property by local officials.

In making the above recommendations, it is not intended to suggest that any state should be discouraged from adopting sound and desirable modifications of the deferred timber tax plan or from adopting any other sound plan more suitable to the conditions in that state, nor that federal assistance be denied in financing such a modified or substitute forest tax plan.

AMENDMENT TO ARTICLE VIII AND SUPPLEMENT TO ARTICLE X OF THE LUMBER CODE

In acting on the report of Committee I the conference recommended (1) a supplement to Article X of the Lumber Code which would include basic provisions for forest conservation on private lands, and rules of forest practice to be issued and made legally effective by the Lumber Code Authority and (2) to encourage sustained yield forest management, the Lumber Code Authority be requested to give preference in production allotments under Article VIII to operators observing such practice. (See Nos. 13 and 10 of the digest of Conference recommendations). The Code Authority informally requested the Joint Committee to help it in drafting these supplements and amendments. The Committee submitted its suggestions on February 8. The following supplements and amendments were formally adopted by the Authority on February 9:

SUPPLEMENTS TO ARTICLE X

(a) Supplementing Article X, and based upon the recommendations of the Conference held pursuant thereto, the following supplements provide for the

initiation and administration of measures necessary for the conservation and sustained production of forest resources, by the industries within each Divisions, in coöperation with the appropriate state and federal authorities, it being recognized that the extent to which these undertakings of the industry are capable of successful accomplishment is dependent upon the extent and character of public coöperation in each state.

(b) Each Division and each Subdivision having jurisdiction over forest utilization operations shall establish or designate an agency or agencies to formulate and from time to time to revise rules of forest practice, and to exercise general supervision over the application and enforcement thereof in the operations of the persons of the respective Divisions and Subdivisions. Such agencies shall have as non-voting, advisory members one representative of each of the state and federal organizations which have definite responsibility under state and federal law for forestry or forest protection practice within the several Divisions and Subdivisions. Each Division and each Subdivision shall provide such technical and other qualified personnel as may be required to furnish necessary information to said agencies and persons, to inspect the forest operations of said persons, to enforce such rules of forest practice, and otherwise to carry out the purposes of this article, under the said general supervision of said agencies. On or before April 15, 1934, each such agency shall formulate such rules of forest practice and shall submit them through the appropriate channels to the Authority for its approval. After such approval the Authority shall publish separately for each Division and Subdivision approved forest practice rules, which, on and after June 1, 1934, shall be obligatory for all persons subject to the jurisdiction of the said Divisions and Subdivisions, respectively.

Upon application by a Division or Subdivision, or upon its own initiative to secure compliance with this article and equal application thereof within and between the several Divisions and Subdivisions, the Authority may amend such rules of forest practice; such amendments shall be published by the Authority and shall be effective 30 days after the date of such publication.

(c) Said rules of forest practice, to insure the conservation and sustained production of forest resources, shall include practicable measures to be taken by the operators to safeguard timber and young growing stock from injury by fire and other destructive forces, to prevent damage to young trees during logging operations, to provide for restocking the land after logging if sufficient advance growth is not already present, and where feasible to leave some portion of merchantable timber (usually the less mature trees) as a basis for growth and the next timber crop. Said rules of forest practice shall be adequate to secure the purposes of this article, and in a practical way in accordance with conditions existing in the respective Divisions and Subdivisions shall secure application of the following principles:

1. Fire protection during and immediately following logging is an indispensable condition for forest regrowth. Responsibility for adequate provision for control of fires during or immediately following logging operations rests upon the individual operator if he is in any way the cause of such fires. Each operator shall be definitely responsible for taking practical measures of fire control. Such measures shall, to the extent necessary to provide adequate protection, include slash and snag disposal, rules as to use of fire by employees including smoking in the woods, equipment of logging locomotives and engines with adequate devices for preventing fires, having available upon

call crews properly equipped to fight fires, closing operations during exceptionally dry periods, and other precautionary measures. Where a general fire protection system is in effect, each operator shall correlate his protection system with the general system, but such general system shall not replace the protection system of such operator, nor shall it relieve him of responsibility for protecting his own property to the extent that he has created the hazard. He shall not be considered to be responsible for fire caused by public carelessness or by inadequate public protection.

2. To the end that protection against fire and other destructive forces may be rapidly extended to all forest areas that require protection, said agencies shall endeavor to secure action on the part of all operating forest land owners in the direction of coöperating with public organizations in systematic fire prevention and suppression and such protective action as may be practicable for protection against insects and diseases. Such agencies shall also seek to secure such coöperation on the part of non-operating forest land owners.

3. As much as practicable of the advance growing stock upon the land in the form of young trees of valuable species below merchantable size shall be preserved during logging operations and left without injury for future growth. Each operator shall require his woods employees to exercise conscious care to reduce damage to advance growth to the minimum practicable.

4. To secure natural reproduction, which will usually be obtained where partial cutting is practiced, there shall be left on the logged areas, where economic and other conditions permit, a sufficient number of trees of desirable species to yield a commercial cut at reasonable intervals. Under certain conditions, instead of partial cutting, the leaving of seed trees

or groups of seed trees on or adjacent to logged areas may be sufficient to insure the required regrowth on the logged areas. If there is an insufficient reserve stand, or if conditions are otherwise adverse and the prospects of securing natural reseeding are uncertain, planting may be desirable.

5. To the extent practicable, partial cutting or selective logging shall be the general standard for local measures of forest practice.

Said agencies shall without delay, making use of existing information, undertake to determine by regions or by forest types, the extent to which merchantable sizes of trees may wisely be left as part of the forest growing stock. Upon satisfactory determination of such conditions said agencies shall promptly establish standards of practice looking to the attainment of this objective.

In certain regions or forest types, and under certain conditions, which do not justify partial cutting or selective logging, other methods shall be allowed.

These rules of forest practice shall also apply to persons whose operations are in timber held under "lease" or "timber cutting rights" existing prior to the date of the President's approval of these supplements to Article X, provided that due consideration shall be given to the ownership equities involved in order to avoid causing such persons unreasonable hardship by requiring the leaving of trees of merchantable sizes.

6. In order to provide flexibility, each operator shall be encouraged to communicate to his agency the methods which he proposes as best suited in his individual operation to achieve the declared objectives of conservation and sustained production of forest resources, and if such proposed methods are determined by said agency to equal or excel the regional or type standard methods, they shall be approved in lieu thereof. This in effect

permits modification of regional or type standards upon submission and approval of specific individual management plans.

7. Said agencies shall, each within its own jurisdiction, investigate the feasibility of and shall actively encourage the application of sustained yield forest management wherever feasible. Sustained yield forest management is defined as management of specific forest lands, under single ownership or co-operative control within an economic unit, under definite management plan which limits timber cutting to the capacity of such forest lands under existing methods of management as determined from existing growing stock and growth, to provide without interruption or substantial reduction raw material for industry and community support.

8. This Article with its supplements, the rules of forest practice and any other rules and regulations adopted pursuant thereto being adopted in order to give effect in the public interest to the declared purposes of the Article, may be enforced only by the United States through its appropriate enforcement agencies and officers. Nothing contained in this article and its supplements, or in the rules of forest practice or in any other rule or regulation adopted pursuant thereto, shall be construed to enlarge, increase, change or affect the legal duty, liability or responsibility of any person subject to the jurisdiction of this code to any other person, firm or corporation, whether or not the latter is subject to the jurisdiction of this Code, or to give to any such person, firm or corporation any right or action against any person subject to the jurisdiction of this code which would not have existed if this Article had not been adopted.

(d) The Authority shall issue interpretations and shall promulgate rules and regulations necessary for the enforcement of this Article, to prevent evasion and to secure equitable application thereof.

Amend Article VIII (k) by adding the following:

"Pursuant to the foregoing each eligible person who makes application to be recognized as securing his raw material supply from forest lands under his ownership or control which are managed on a sustained yield basis, and who secures from his Division or Subdivision agency provided for in Article X (b) a certificate showing that he is in good faith conducting his operation upon such basis, shall have his production allotments, as determined without the benefit of this paragraph, increased by 10 per cent. If only part of his raw material supply comes from such sustained yield operation, his increased allotment shall be that proportion of 10 per cent which the volume of his raw material coming from such sustained yield operation is of his total volume. Sustained yield forest management is defined in Article X (c) 7. The additional production allotments provided for in this paragraph shall come from the total national production quotas.

These additions to Articles VIII and X of the Lumber Code are to be submitted to the N.R.A. for its action and to be transmitted by it to the President. On his approval they become a part of the Lumber Code.

FURTHER WORK OF THE JOINT COMMITTEE

The Conference's recommendations as to public action, necessary to the accomplishment of the purposes of Article X, have been put in shape for submission to the Secretary of Agriculture for submission by him with his recommendations to the President for his action. In this connection an outline has been prepared of the amended, or new, legislation which will be necessary.

This statement brings down to date action under Article X of the Lumber Code. The Joint Committee after completing its present duties will adjourn for the time being, but ready to reassemble as occasion may require, to assist with the furtherance of the undertaking.¹

NOTE: The Forest Service during the Conference reserved its decision on paragraphs 5 and 6 of the Subcommittee Report on Forest Credits. Following further consideration it states its position as follows:

1. The Forest Service will endorse the recommendation for an offer of federal loans to establish and maintain the state timber tax fund through a period of 5 years as recommended in the forest taxation program adopted by the Executive Committee.
2. The Forest Service does not endorse federal loans to individuals for payment of timber taxes except as these loans may later be included as incidental loans to be made under a permanent forest credits set up.
3. The Forest Service believes that 50 million dollars will be ample for purposes of loans to states and for setting in motion a system of forest credits. It is assumed that the major part of the funds for forest loans will be derived from bonds and debentures of forest credit banks rather than from appropriations.

¹Copies of this Conference Report available for 25c a copy, Society of American Foresters, Washington, D. C.

AN AMERICAN PLAN FOR FORESTRY

BY G. F. JEWETT

President, North Idaho Forestry Association

The writer of the following proposal looking toward solution of the forest problem is a graduate of the Harvard School of Business Administration, where he specialized in lumbering under Professor Richard T. Fisher. He has been with the Weyerhaeuser interests for 12 years. For the last 5 he managed their operation at Coeur d' Alene, Idaho. As Chairman of the Forestry Committee of the National Lumber Manufacturers' Association he was invited as a conferee to the recent Forest Conservation Conference. As a result of his experiences and observations he has drawn up an outline of a plan which he believes would perpetuate the commercial forests in a manner which would preserve the benefits of private enterprise and also protect the public interest at minimum cost under the new economic order. His forebears on both sides had timber interests and it is his ambition to pass on these properties to his descendants.

THE American people are confronted with making an immediate choice between private and government ownership in conserving their forest wealth. The U. S. Forest Service has recently submitted "A National Plan for American Forestry," commonly referred to as the Copeland report. As its title implies, it proposes nationalization of the forests. The following plan contemplates making forestry a field for private endeavor.

Private individuals deplore the "mining" of our forest resources of the past. They recognize the national benefits which will follow "farming" our forests in the future. Stated briefly, this will perpetuate the raw material supply of one of our largest industries. It will stabilize values in communities dependent upon this industry. This in turn will correct the social evils incident to the transitory character of the business as conducted in the past. It will protect watersheds, thus stopping erosion and diminishing floods. It will improve the climate. This, together with water flow, will better the health of the people. It will provide recreational facilities including opportunities for appreciation of nature, quiet, solitude, healthful exercise, hunting, fishing and boating. It will provide game refuge, which has

commercial as well as recreational aspects. These may be regarded as the fundamental benefits to be derived from the general practice of forestry.

It is the purpose of the following plan to point out how private industry may be organized to secure these benefits for the public, at the same time assuring the incentive of private enterprise at very much less public expense than appears involved in other solutions of the forest problem.

BACKGROUND

The Pilgrim fathers burned trees to clear submarginal agricultural land—improper land use which was impelled by stern necessity. Pioneer conditions, under which most of our lumbering has been done, required a lavish use of natural resources to enable people to exist. Uncontrolled private enterprise exporting these natural resources made the American standard of living the goal of all other peoples. Coördinated private enterprise, utilizing the growing store of human knowledge, can provide an even higher standard of living for the future. It is in the province of government to oversee such coördination. Socialistic burdens upon private enterprise in the form of unreasonable taxation, the tremendous increase of population in

proportion to natural resources diminished through improper handling, governmental organization which has been unable to advance with the times, combined with a general lack of understanding of conditions, have led to a breakdown of our economic system. This breakdown in the forest industries has been intensified by illogical divisions of forest ownership which are due to historic causes. The U. S. Forest Service, in the Copeland report, recognizes the existing diverse ownership of land as the principal obstacle to solution of the forest problem. Government and private enterprise alike are to blame for disposing of lands for purposes to which they were not suited. Much of this was due to ignorance; much due to greed on the part of the public as well as on the part of the private individuals.

The prevailing tendency is for forest land to pass into the ownership of the public. Most cut-over lands are tax delinquent as are considerable areas of timbered lands. There is considerable agitation to encourage the government to purchase such lands. The Copeland report recommends the public acquire over half of the forest area. Since about 26 per cent of the forest area is in farm wood lots, much of which would presumably remain so, there would not be much left for private enterprise. This purchase would require huge outlays of public monies.

THE PROBLEM

The tendency of government to acquire large amounts of forest land is incompatible with the private practice of forestry. Ownership of the forest lands will necessarily mean ownership of the future forest crop. Costs of the practice of forestry have very faint connection with the sale price of public timber, whereas on private lands the relationship between cost and selling price spells success or

failure for the enterprise. Experience in the Inland Empire throws this into specially strong relief because there government timber is particularly active in competition with private. Government timber is being sold at far below the tax cost of private timber, and yet the cost of public timber to the general taxpayer greatly exceeds its sale price. The public interest in forestry would be more economically served by private enterprise because it is not so subject to political demands.

The crushing burden of taxes on the larger quantity of private timber in the Inland Empire does not equal the excessive costs on the smaller quantity of public timber. The industry is already subsidized to the extent of the difference between these two amounts. Thus experience already proves that the private timber of the future will have to face the competition of public timber just as the wheat farmer had to face the competition of the tremendous wheat reserve purchased by the government. This will effectively discourage private enterprise from underwriting the costs incident to the practice of forestry.

The sustained yield unit plan is generally conceded the best adapted to "farming" our forests. Great diversity of ownership in each sustained yield unit area is incompatible with the orderly harvesting of the forest crop. A variety of motives will govern the disposing of timber in the different ownerships. The situation is analogous to that which is leading to the forming of oil pools. Taking part of the timber in a drainage would frequently leave the remainder isolated because of high improvement costs. The marketing problem involved in this diverse ownership resembles in some respects that which led to the forming of the farmers' co-operatives.

The problem then is how to meet the above described conditions in a manner which will promote the public welfare at the least cost to itself and yet will pro-

vide an incentive to secure the benefits of private enterprise.

THE PLAN

It is proposed that the country be surveyed with a view to dividing up the forest areas into logical sustained yield units. In each unit a pool would be formed of all the assets connected with the business. Each owner should receive his share of the proceeds in the proportion that he contributed assets. The pool, like a public utility, should be endowed with the right of eminent domain to assure control of all the assets required for its successful operation.

The sustained yield forest partakes of many of the aspects of a public utility which should justify the public in granting the right of eminent domain. These aspects pertain more to regularity of service, assuring the public of a perpetual supply of forest products. Even more important from the public standpoint is the continuous service of what might be termed by-products of the forest, such as watershed protection, recreational facilities and game refuge. Public supervision should be directed primarily to see that regularity of service is provided. It is suggested that the U. S. Forest Service would be the agency to see that proper silvicultural practices were followed to assure sustained yield. Since the product of the forests is not generally consumed locally and since the public would be protected by the competition of the products from the various competing sustained yield units, it would probably not be necessary to control prices as are rates under a monopolistic utility. Of course if a tendency should develop to centralize control of the pools, then the public would have to control prices the same as it does rates.

It must be recognized that certain areas lack economic sustained yield possibilities

at certain price levels, that is to say, the carrying costs exceed the annual yield. It is suggested that such areas be administered by the U. S. Forest Service to protect watersheds, game refuge, etc., and sale of their products be prohibited until such time as economic conditions should justify their being turned over to an existing pool or a new one formed.

The problem of government competition would still enter because of the fact that the government would control some pools by reason of contributing the majority of the assets. This should present no special difficulty if all governmental costs were accurately charged to the operation of the pool. If these costs should exceed the yield for a sufficient period, the area would be classed as uneconomic and the sale of its products prohibited. Another solution would be the public sale of the government's share of the various pools.

The above plan meets the problems presented by the mountainous areas of the West where control of all the timber in one drainage is essential to economic operation. Here operations have to be of a sufficient size to be able to finance the expensive improvements required. The conversion facilities would probably be on a larger scale than in the more level areas of the East and South where smaller sustained yield units would be practical. However, the plan would work here equally well. The character of the sustained yield unit pools would probably vary with the different conditions.

This plan would retain the benefits of private enterprise. It would greatly reduce public expenses which seem to be involved in most other solutions of the forest problem. In fact, if the government sold their interests in the pools, the plan might provide present available funds instead of present expenses.

It would greatly facilitate the administration of the lumber code by organizing the forest areas into controllable units.

Allocation of production allotments to sustained yield capacity, the sine qua non of successful forestry, would be greatly simplified. At the same time it would provide employment for the same number of persons. Man hours required to accomplish a certain job are substantially the same in large operations as small ones because of the nature of woods work. In the mountainous areas of the West the "gypoo" system would still give free play to the small operator under supervision of the pool. In the more level regions of the East and South the small operator could conduct a sustained yield operation.

The plan is fair to the small owner as well as to the large one. Both have invested their savings in timber property in the expectation of profit from the forest products industries. It is just that they should be asked to coöperate for their own good as well as for that of the public. The advance of our civilization has brought about changes in conditions which were unforeseen at the time many of these investments were made. Public necessity requires more planning ahead than formerly. Success in forestry demands a special degree of foresight.

Dr. Fred Rogers Fairchild, Director of the Forest Taxation Inquiry and leading authority on timber taxation, recognizes that the high cost of local government is a fundamental factor in the forest tax situation. The right of eminent domain granted the pools would enable them to include those submarginal agricultural lands which are best suited to forest purposes. This would facilitate the zoning of land according to the use to which it is best suited along the lines of the Wisconsin plan. This would facilitate disorganizing uneconomic governmental units by removing the necessity for their existence. It would have the beneficial social effect of removing settlers from lands which at best could support them at a low standard of living, and which at the most, make them completely a burden upon the pub-

lic. Thus, the property tax on timber could be materially reduced. The timber owners in Maine recognized this principle many years ago when they prevented settlement in the timbered areas.

The U. S. Forest Service recognizes sustained yield organization as the most important single measure to place forests on an equality with other property in respect to taxation. This is because other property usually has an annual yield. An acre of saw timber commonly has a yield once in 50 to 150 years, depending upon the rapidity of growth of a new tree. By making that acre a part of a sustained yield unit it would contribute its share to an annual return, which from the nature of things can be much more equitably assessed. It must be borne in mind, in connection with the public justification for this proposed plan, that all during the 50 to 150 years necessary to develop a saw log, this acre of forest land is contributing public benefits in the shape of watershed protection, recreational facilities and game refuge.

Since the sustained yield unit is presumed to have an annual yield, the form of tax becomes relatively unimportant. The property tax would be just as applicable as a yield tax of corresponding rate. The only change that would be necessary in the application of the property tax would be the assessment of the sustained yield unit as one entity rather than the present assessment by legal subdivisions. If this plan were adopted, each present legal subdivision would have no value except as a contributing part of the sustained yield unit.

The present diverse ownership of timberlands is responsible for confusing the public and the assessor as to the value of timber. For example, a small amount of favorably situated timber especially suited to some particular limited present use, such as match blocks, may have a relatively high value. This gives the impression that all timber has a like value.

The fact is overlooked that to have a continuous operation requires many years' supply. In fact from the sustained yield standpoint in a virgin forest where a hundred years are required to grow a tree, one per cent of the forest has no more value than cut-over land which has been adequately seeded, because the cut-over land will have a crop ready for operation at the time it is needed. This is true, of course, only under a sustained yield set-up. Under the present destructive method of exploiting the forests, the one percent we are discussing is just as valuable as the one per cent being currently cut assuming equal accessibility. The assessor correctly holds that one piece of timber could have been cut just as readily as the other. The proposed sustained yield unit plan would force a recognition of the true value of forest property. It would then become practical for the owners to make a definite showing as to present worth of their property and so enable them to save their property from unreasonable taxation which in many regions is actually confiscating it. Experience has proven that even where owners have made a scientifically correct showing as to values of timber property, the public authorities have insisted upon levying confiscatory taxes. The proposed plan would effectually prevent this in the future because where taxes could be proven to confiscate forest property, the area would be classed as uneconomic and sale of its products prohibited. Under the plan the area would thus come under the supervision of the U. S. Forest Service and no taxes could be levied against it. Thus the taxing authorities would be forced to be reasonable.

It must be recognized that this plan would require many radical changes in the setup of the timber business. For example, there are areas where more sawmills are operating than can be supported by the sustained yield capacity, and on the other hand there are many areas

where the sustained yield capacity is far in excess of the existing conversion facilities. The present is an ideal time to remedy this situation as large amounts of useful employment could be provided in building new mills, erecting new communities and providing other necessary facilities in the undeveloped sustained yield areas. While it is true that hardships would be occasioned in those areas which are producing in excess of their sustained yield capacity, it should be recognized that without a change it is only a question of time before such areas will be without any economic support. The sooner the change is made to the correct basis, the less serious will be the consequences.

Experience has proven the inability of local governmental units to recognize the broad public interest in the subject of forestry. Even where individuals have been big enough to recognize these principles, they have been forced by the exigencies of the present to act contrary to the interests of the future. Since the timber supply of Washington affects the builder in New York, since the forests of Minnesota affect the floods in Mississippi, since the forests of Maine affect the vacationist from Texas, since the merchant in Missouri buys furs from animals killed in the Michigan woods, since the farmer in Illinois ships his crop to market cheaper by reason of the contribution of freight revenues from lumber cut in Louisiana, since the irrigationist in California gets his water from the forest of Arizona, forestry is a national problem. Only through the disinterested guidance of the President and Congress can conservation of the forest resources of the nation be attained. The people of the United States are fortunate in having as President, at this time, Franklin D. Roosevelt, who has shown a greater interest in the solution of the forest problem than any other man. This great national resource has its best chance of conservation under his enlightened leadership.

COMMENTS

By WILLIAM L. HALL

Consulting Forester, Hot Springs, Ark.

MR. JEWETT'S paper is a timely and important contribution on the subject of the forest land policy of the United States. The writer was privileged to read it in manuscript form several weeks ago. He found the point of view so sane and constructive and the argument so clear and forceful that several times it has been reread in whole or in part. It has been especially helpful in connection with the program being formulated for sustained production on privately owned forest lands and in charting the course towards a broad program of sustained yield, involving both public and private holdings.

Mr. Jewett has helped greatly in pointing out the first step to be undertaken. This without question is the determination in forest regions generally of logical units of operation. The appropriate agency to do this is the Forest Service and a satisfactory present means in the forest survey. The Forest Conservation Conference recommended as follows:

"The present forest survey should be hastened, and be extended to include determination of logical sustained yield units, with supporting facts as to classes of timber, protection and development needs, growth potentialities, and analysis of ownership status."

The next step also has been indicated by Mr. Jewett, though in fairness I must say that David T. Mason has been equally clear on this point, which is that public forests in any unit should become the nucleus for sustained yield organization.

Beyond this the paper may also have

great value in indicating the logical course of development. Certainly it presents a plan that deserves most careful study. To this writer the plan appears to have the following advantages:

1. Removes completely the threat of forest devastation.
2. Facilitates forest protection.
3. Provides experienced and intelligent management for all timberlands of the unit, including scattered lands, whether owned privately or publicly, and gives all lands equal treatment and participation.
4. Insures adjustment of conversion facilities to growth capacity by orderly steps.
5. Facilitates balance between quota production and growth and if carried out nationally insures orderly production control for the country as a whole.
6. Furnishes a basis for controlled, permanent sustained yield.
7. Affords a sound basis for adequate financing.
8. Obviates necessity for a huge program of public forest ownership.
9. Provides opportunity for individual initiative and experience, directed to definite constructive ends, with favorable supporting conditions. It removes present uncertainties inherent in private ownership of forest lands.
10. Offers a nation-wide solution of the forest problem on the basis of private and public coöperation.

This plan if put into effect would call for much public coöperation along appropriate lines as follows:

1. Legislation to authorize plan.

2. Surveys to locate proper sustained yield units and to determine sustained yield capacity of units.

3. Approval of unit organization.

4. Approval of valuations of lands and facilities.

5. Approval of management plans and silvicultural practice.
6. Voice in balancing cut with growth.
7. Securing equitable taxation plan.
8. Adequate financing of unit on basis of approved plans.

COMMENTS

BY WARD SHEPARD

Bureau of Indian Affairs, Washington, D. C.

STRIPPED of details, Jewett's proposal is to create *an organized, conscious effort* to bring about sustained yield forestry. It has many points of similarity to the Mason plan submitted to the Timber Conservation Board. Jewett's proposal, in my opinion, is not only sound and feasible but is an indispensable part of the New Deal in forestry. Poor old *Laissez-faire* as an economic and political "philosophy" is buried ocean-deep under the tidal wave of national planning. Article X of the Lumber Code is a very considerable wave in that mighty movement.

But we must not stop short merely with better and more conservative woods practices. The real goal is sustained production of forests. And we cannot afford to let the attainment of this goal rest with the individual initiative, here and there, of the more progressive forest owners. Sustained yield private forestry was, indeed, worked out in Central Europe by precisely that process. But it was enormously forwarded by a land-holding system built round the pride of ancient feudal families to whom land was the source of income and of power. And it was worked out in leisurely fashion before modern industrialism had found the means to large-scale forest destruction. We can not afford to be leisurely. We can not establish sustained yield forestry unless we preserve a large portion of the

existing growing stock. "Minimum requirements" are not enough. We can and should consciously organize the movement for sustained yield regionally and locally, so as to bring to bear on the problem the integrated co-operative effort of public and private forest owners and of all public agencies concerned with integrated regional planning.

One way to do this is to organize the movement round the Divisions of the Lumber Code authority, bringing to bear all the organizing and administrative talents of the industry, the Forest Service, and other public agencies to the solution of the problem. Another way would be to make organized sustained yield forestry a definite part of the job of the Tennessee Valley Authority and of other similar regional projects organized in the future. Foresters could well take the lead in promoting a "Tennessee Valley Project" for the Pacific Northwest that would have as one of its major goals the working out of sustained yield for all forests of the region.

Jewett's plan should be instrumented. Instead of debating the principles—which, I think, are irrefutable—would it not be well to concentrate on practical local plans to make a start in putting the principles into effect? Here is a fine chance for individual and public statesmanship opened wide by the larger purposes of Article X.

A STUDY OF FOREST DEPLETION CHARGES

By JULIAN E. ROTHERY

Forest Engineer, International Paper Company

The subject of forest depletion charges has not received the study by foresters to which its importance entitles it, though it is an intricate subject, often involving a thorough knowledge of forest engineering as well as accountancy. The first part of the following article deals with the problem where reasonably sound book values are available as the basis of capital investment, and emphasizes the percentage of recoverable timber, growth, suppression and economic life span. The latter part of the paper deals with the more difficult problem where book values are inadequate or unavailable and assets must be revalued, a particularly important problem today.

THE study of depletion of those natural resources usually classed as wasting assets, such as oil and gas fields, mines and forests, received a great impetus with the adoption of the United States income tax law of 1913.

In regard to standing timber, the law in general provided that as the quantity diminished through removal, a deduction from the income derived from it could be made, based on the value of the timber removed—this charge or depletion allowance being considered as a return of the capital investment in the timber, and therefore strictly speaking, not the income.

It is this basic difference between return of capital and income that underlies studies of depletion, and has a great bearing on sound financial and accounting practice, quite apart from any question of income tax.

More specifically defined, the theory of depletion is based on the fact that, as the resource is extracted and converted into money by the sale of the product, the capital represented by the quantity thus extracted or depleted should be returned, so that at the time of exhaustion of the asset the entire capital in it will have been written off or retired.

A writeoff, as such depletion charges are commonly called, is a proper charge

against earnings as a part of current costs and can be credited to a depletion reserve or directly to the capital account. Assuming the pursuit of a sound financial policy in a prosperous undertaking where the sale of products brings sufficient price to cover full cost and fair profits, such reserves will, theoretically, at any period indicate the existence of cash or investments sufficient for the replacement of the value of the amount of the asset removed.

Depletion charges may be based on a certain percentage of gross or net income. In the United States for example, in regard to oil and gas properties, where the total recoverable quantities are difficult to determine, a depletion charge for income tax purposes of 27½ per cent of gross income is allowed. Canada has allowed a charge of 33 1/3 per cent of net income for income tax purposes in regard to mines, a method approved by many engineers as more simple and equitable for this class of resource than the unit depletion for mines followed by the United States Government. It may also be noted that the Canadian income tax law formerly covered depletion of pulpwood by the simple expedient of granting \$2.00 per M¹ allowance, a ruling now under revision, however.

While the percentage method above referred to is at least of definite application,

¹M signifies 1000 feet board measure.

it may have little or no relation to the actual diminution of the raw material or the proportion that this forms to the total. Therefore, for timber, it does not seem to me as sound or logical as depletions based on specific amounts removed, where this figure and the remaining quantities can be so closely calculated; the following deals with the method of unit depletions.

In any study of amortization there are two formulæ which are very useful, the annuity formula and sinking fund formula, which are shown graphically in Figure 1. The annuity formula gives the equal annual sum embracing both interest and retirement of capital required to extinguish an investment and pay its attendant interest in a given period.

It is obvious that interest is maximum at the first year and thereafter steadily diminishes to zero with the retirement of capital. It is also obvious that if an equal sum is set apart every year, the interest will comprise a large proportion of it in the first year, and consequently depletion but a small portion, a ratio which will be reversed in the latter part of the period.

Therefore, the annuity formula, while amortizing a definite sum at the end of a definite period and useful for preliminary estimates of fixed charges, does not reflect adequate depletion at first. More nearly it follows the course of depreciation or obsolescence charges which may be small at first and increase later.

The sinking fund formula determines the equal annual amount, which, if set aside and placed at interest, will at the end of the period involved have built up a sum sufficient to equal or amortize the original debt without its attendant interest charges. Reinvestment of sinking funds or reserves is often calculated on a more conservative rate of interest than that paid on capital. If this is done and the interest on the total amount of the principal

be charged throughout its life, as it would have to be in order to compare this method with the annuity formula, then the total charges determined by the sinking fund method will necessarily be somewhat higher than those obtained by the annuity method. For example: by the annuity method \$1,000,000.00 and attendant interest at 6 per cent can be amortized in forty years by forty annual installments at \$66,400.00 each. For the first year \$60,000.00 of this is interest and \$6,400.00 is retirement of principal. Thereafter the interest charges will decline as the balance of the principal falls, a process which rapidly accelerates during the latter part of the period. By the sinking fund formula we find that \$10,520.00 annually set aside and reinvested conservatively at 4 per cent will have built up a total of \$1,000,000.00 in forty years. If, however, \$60,000.00 a year interest has been paid on the principal throughout this period, a total annual charge for both principal and interest of \$70,520.00 is incurred, against \$66,400.00 as determined by the annuity formula.

FORESTS AND THEIR PECULIARITIES

At this point it may be well to touch briefly upon some of the peculiarities of forest resources.

In the first place, a forest is different from a mine or gas field, in that it may accrete by growth and under management perpetuate itself indefinitely, even increasing in volume though perhaps losing in quality. This factor of growth is the basis of much misconception and misstatement in regard to forest investments and depletions. Young forests have a net increment it is true, but mature forests where growth is balanced by decay are in equilibrium and there is no net increment. A virgin forest however, while never cut, may not be mature and might contain large areas of second growth,

springing up after extensive burns or windfalls. It may then have a very substantial net increment due to increase in volume and to the passing into merchantable size (perhaps in a comparatively short time) of trees heretofore not large enough to have been computed in the merchantable quantity.

The factor of growth is well recognized in Europe, where forests under intensive management are not usually considered depletable, any more than are farm lands, due to the renewal possibilities and stability of demand. However, I do not think that this is a sound basis for forests on this continent.

While there are conditions where the effect of growth may reasonably influence depletions, timber assets should as a rule be written off and the capital retired, even though the physical resource can be maintained almost indefinitely. Our forests are so extensive and so diverse and industry so complex and changing and cheap transportation so universal, that no one can foresee the shifts and changes over a long period of time. It may sound odd to talk about a forest growing obsolete or being superseded, but nevertheless we are turning from wood to other materials and the per capita use of it is falling. More important in this respect than the substitutes for wood is the competition or rivalry of different regions or species, spurred on by transportation or manufacturing stimulants, a process which tends to devalue the less favored.

The history of New England white pine shows several instances of this rise and fall in value of a species throughout a region. In the early sailing ship days some of it attained a high value for spar timbers, but, with the change to steam and the falling off of American shipping after the Civil War, this value waned. Sawn lumber operations again brought New England pine well to the front, to decline again under competition from

New York, Pennsylvania and Michigan. Reviving again, the second growth stands became extremely valuable for boxboards, only to fall within the last decade or two from competition with pulp fiberboards for boxes.

Thus, while forests as a whole are still indispensable to our civilization, supersession or diminution of value may attach to specific regions or species, and to write off the capital investment in a forest is a conservative policy, even though the residual stands may ultimately become of great value.

Another point of interest is that cost of operating a forest may not always increase, and the law of diminishing returns, so important in certain types of mines, may not affect all forests, though it may some. In other words, the value of the last of the timber is not necessarily less than that removed at first.

In contrast to certain other natural resources, the kind, quantity and quality of material standing at any one time can be accurately determined and normal costs of conversion closely approximated. A forest engineer does not have to deal with what is buried under ground or puzzle about the complexities of gas or oils or ore bodies of every description. Much of what he seeks to know about timber and its conversion can be ascertained with a comparatively high degree of accuracy.

While the physical status of a forest may be definitely analyzed at any specific time, its future development is exceedingly intricate. For instance, economic selection in logging the mixed sawlog stands of the West Coast, which is receiving a great deal of study these days, shows that the value of a forest does not necessarily depend on the total volume of what is usually designated as merchantable timber. Due to variations in logging and converting costs and sales price, a selective system which removes from cer-

tain areas certain species, sizes and grades, may yield a far greater return than clear cutting the entire stand. In one case a tract carefully analyzed and tested showed that it would take approximately 24 years of the estimated life of 30 years of the tract to return the capital investment if it were cut clear. By economic selection and only partial removal, the capital could be returned in less than half that time.

LOSS—SALVAGE AND RECOVERABLE QUANTITIES

In eastern pulpwood, the vast areas involve a maze of variations in growth, losses, utilization and other features, which present their own peculiar problems. Furthermore, when it comes to the peculiar hazards created by fire, wind, insects and disease, the forest engineer must deal with unpredictable forces of great destructiveness, and any one of these hazards may practically destroy an extensive forest.

Fire is subject to a certain amount of control, generally increasing, but the other hazards are practically uncontrollable, especially if of wide extent. The expectation of fire loss may be estimated from the records of forest protective agencies and from the records of burned areas over the last century, as disclosed by forest surveys. The other hazards are much less determinate.

Some estimate of salvage possibilities too must be considered, and these will vary greatly with the degree of accessibility, the nature of the loss, whether it is concentrated, as results from a fire, or scattered and limited to certain species or sizes or locations of trees, as commonly originates from the other hazards.

Vague as these factors may be, depletion must rest on the amount of recoverable assets, not the gross, and some reasonable approximation of this proportion

will result in a charge which, applied year after year in average seasons, will build up a reserve which should largely take care of normal periodic losses.

SPAN OF LIFE AND CAPITAL INVESTMENT

The time element in the life of a forest and the capital investment in such a forest are particularly pertinent. A forest investment may be very short, only a year or two, and again it may extend over a remarkably long period.

Generally speaking, the greater the capital invested in the converting plant per unit of output, the longer should be the supply of raw material, though the amount of money realized and available for plant depreciation and fixed charges will of course affect this.

The paper industry, with a high plant investment, a slow turnover, highly competitive market and low margin of profit, must look forward to a long span of life in which to depreciate the plant, and therefore to long supplies of timber. This fact, together with the fact that a pulpwood rotation in the north may be seventy or eighty years, has given the industry a long distance view of forest holdings, but I sometimes wonder if it may not be too long, considered from the strictly financial or accounting viewpoint.

Two curves are shown in Figure 2 which will help to clarify this element of time. The curve A shows the present worth of future rentals continuing for 10, 20 or more years, at six per cent discount. It will be seen that the present value of a profit or rental continuing for more than 25 or 30 years in the future is but little greater than the present value of a rental ceasing at that period, and that a rental extended to 100 years even shows a present worth but slightly more than that of a rental ceasing at 100 years. The curve B shows the annual write-off for straight line amortization of any sum, such as a

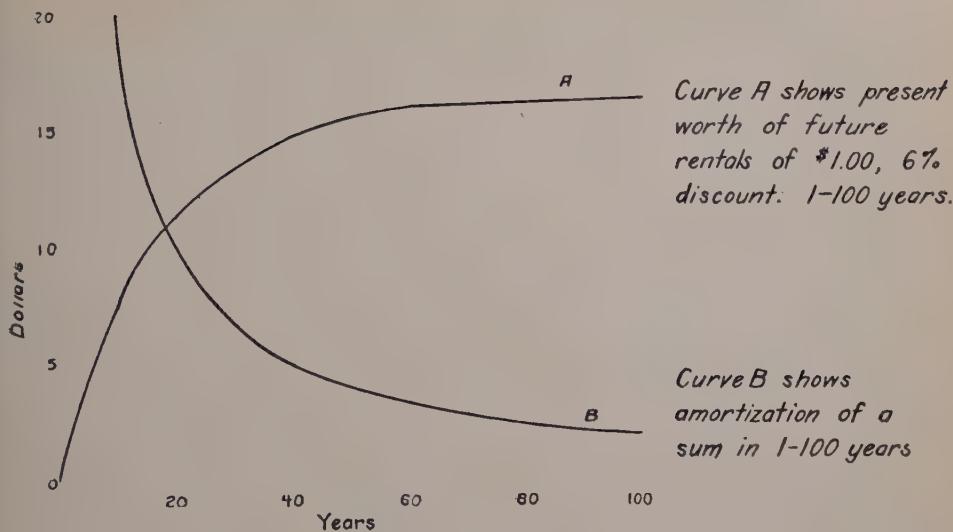


Figure 2

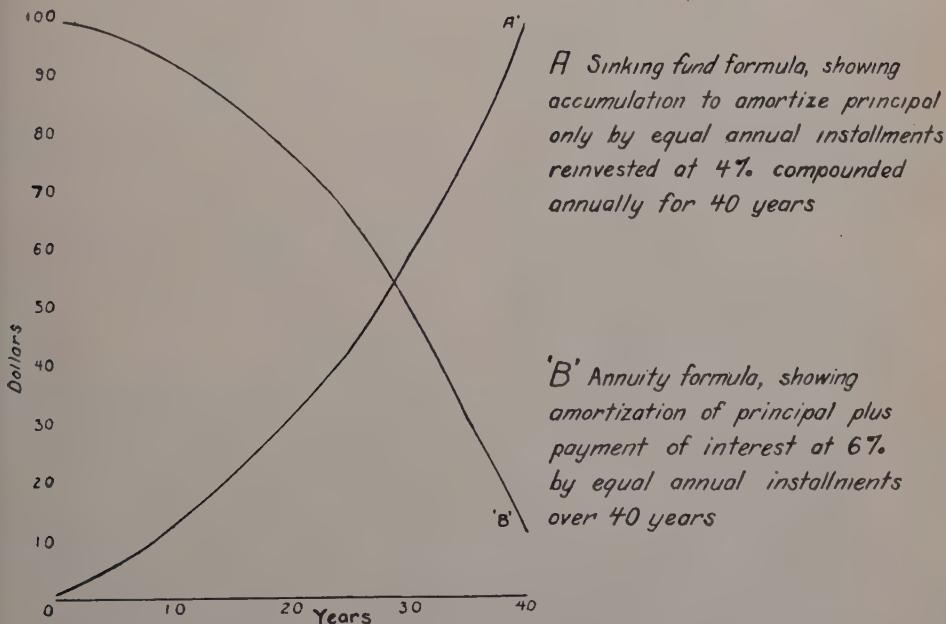


Figure 1

mill and timber investment, in from one to one hundred years. It will be noted that the amounts to be written off annually are high if the span is short, that only when the period approaches 30 or 40 years do they fall markedly, and that for longer periods the decrease per year is slight. It is for this reason that the period for depletion or depreciation, if extended too long, gives but slight diminution in today's charges and carries the investment far into the uncertain future.

These curves may be taken to indicate roughly the economic span of life of a modern newsprint mill and its timber supply. Such a span is bounded by points short of which depletion and depreciation charges would be very heavy, and beyond which such charges would drop but little. Also, the major part of present value of future realizations from the timber falls pretty much within that span. Furthermore, if we were to consider mill obsolescence and repairs, which would probably mount more rapidly than physical depreciation, we would shorten this economic span of life of the investment.

Again, time is one of the chief factors in determining the total accumulation of growth, and even the slow rate of increment in northern spruce, which is usually between 2-3 per cent annually over the better part of the life of a forest, will mount to impressive figures over long periods. The effect of this on depletion charges must, however, not be hastily assumed.

I have shown that specific forests may diminish in value through economic changes, irrespective of physical depletion.

Reference to curve B, Figure 2, will show that a growth which would prolong a timber supply say from 50-70 years, would have but very small effect in lightening depletion charges, and might well be disregarded for the sake of conservatism. A net increment however, which,

after due allowance for losses and normal mortality, would extend the life of operations, of costly improvements or of plant from a period of high depletion charges into a period of markedly lower charges, as from 20-30 years (see curve B, Figure 2), might carry a distinct element of value, and I believe could be quite properly considered in determining depletions.

DEPLETION CHARGES IN RELATION TO FINISHED PRODUCTS

The relative proportion of depletion charges in different wood-using industries in respect to capital invested in the plant and the price of the product also has its bearing.

A sawmill operation cutting timber of high stumpage value may incur annual depletion charges greater than the capital invested in the mill and in woods equip-

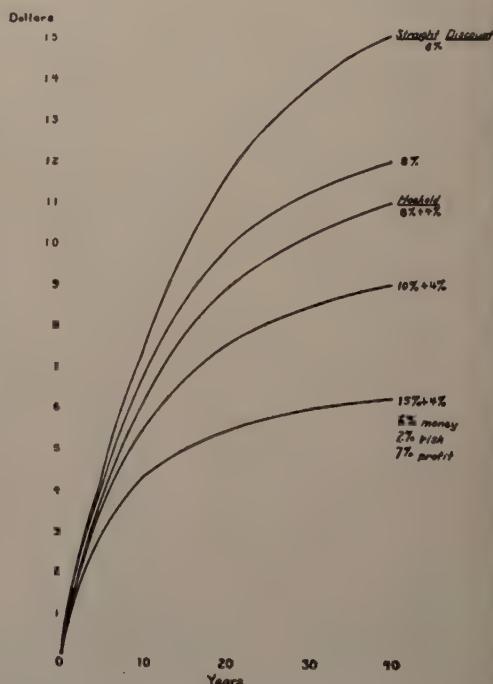


Fig. 3.—Present worth of future rentals of \$1.00 from tables 6 per cent and 8 per cent discount and by Hoskold's formula.

ment combined and may perhaps be equivalent to 15-20 per cent of the selling price of the product. In such a case depletion is a very substantial part of the entire financial setup.

A newsprint mill on the other hand, with a tremendously high capital investment, converting leasehold timber of relatively low value, and selling this product at prices that reflect great enhancement through manufacture, will have depletion charges that are relatively small in the final analysis of costs.

The paper and pulp industry of Eastern Canada, where timber cost and carrying charges are low, is thus enabled to carry reserves of timber of far greater duration than those supportable in many other forest regions and industries.

However, though the depletion charges for pulpwood are thus relatively small per unit, these charges may run over long periods of time and accumulate into a formidable total.

OBJECTIVES AND EXAMPLE

The foregoing brief discussion of the theory and nature of depletion, the peculiarities of forest assets and of paper

Tract A, 1,000,000 M feet @ \$1.00	per M book value	\$1,000,000.00
Tract B, 500,000 M feet @ 2.00	per M book value	1,000,000.00
Tract C, 1,000,000 M feet @ .50	per M book value	500,000.00
Tract D, 1,500,000 M feet @ .33 ^{1/3}	per M book value	500,000.00
<hr/>		
4,000,000 M feet @		\$3,000,000.00

The average cost is 75 cents per M, and included is \$100,000.00 for surveys, cruises and appraisals necessary to determine, analyze and develop the assets and therefore considered a part of their cost.

While the capital invested in these tracts varies from 33 cents to \$2.00 per M, Tracts A, B and C are all similar in intrinsic worth to the mill. The variation in costs here is due to different prices paid at different times and former depletions and revenues credited to them. Ac-

manufacture, helps in formulating a well balanced plan of depletion, which should in general comprise the following:

1. The return of the capital invested in the forest by a logical series of charges concomitant with the removal and conversion of the timber and within a span of time consonant with sound financial considerations, the life of the converting plant and the nature of the forest asset.

2. A simple and uniform scale of charges applicable to varying conditions and quantities dealt with which will tend to smooth out excessive depletion due to periodic losses, and thus promote uniformity of cost.

3. The review and revision of such charges to meet changing conditions.

Below is a simple example dealing with tracts varying in historic costs but which may be pooled to effect a uniform charge quite in keeping with value.

A paper mill of 500 ton daily capacity requires 80,000 M feet board measure per year of timber for its maximum output. The total holdings considered as reserves aggregate 4,000,000 M feet or fifty times the annual maximum required, and are composed of four tracts as follows:—

Tract A, 1,000,000 M feet @ \$1.00	per M book value	\$1,000,000.00
Tract B, 500,000 M feet @ 2.00	per M book value	1,000,000.00
Tract C, 1,000,000 M feet @ .50	per M book value	500,000.00
Tract D, 1,500,000 M feet @ .33 ^{1/3}	per M book value	500,000.00
<hr/>		
4,000,000 M feet @		\$3,000,000.00

tually, these tracts are fully comparable and can be logically amalgamated into one pool of 2,500,000 M feet at \$1.00 per M, without distorting the actual conditions and values and with benefit to cost uniformity.

Tract D on the other hand, is a very remote contingent reserve and probably not needed to supply the mill for the estimated period of its most useful life, and no other utilization or disposition can be seen for its timber in a great many years.

Therefore, the entire timber investment may properly be liquidated from the available Tracts A, B and C. Over the remaining life of the mill, estimated at 25 years, let us assume the consumption will average less than 100 per cent of capacity, say 70,000 M, requiring a total of 1,750,000 M feet. Of the 2,500,000 M feet now standing in Tracts A, B and C, the various classes of losses after all possible salvage, plus unavailable timber, are calculated to reduce the quantity by 20 per cent over the period, thus leaving 2,000,000 M feet, exclusive of growth, an ample mill supply, with a surplus.

The depletion should be based on the 1,750,000 M feet which it is estimated will be converted to return the entire capital investment of \$3,000,000.00; this gives a depletion charge of nearly \$1.75 per M, instead of 75 cents as obtained by dividing the total timber into the total investment. This increase in depletion of

\$1.00 per M will be only slightly more than 50 cents per ton of paper, little enough for a guarantee that the entire capital invested will be written off in a reasonable time and for the avoidance of excessive charges due to losses which must otherwise go against some particular year's production.

If at the end of 25 years when the timber is written off, it is found that, due to lower losses and some growth, 500,000 M feet remain instead of 250,000 M feet, and if also the mill is still serviceable, then what?

This residual timber can be considered as an unexpressed asset whose value will be reflected through greater earnings, on account of the fact that depletion charges are no longer necessary, or it can be written up to its appraised value, thus creating additional surplus. New depletion charges can then be determined in keeping with times and conditions.

PART II.

REVALUATION OF ASSETS

The foregoing has largely dealt with depletions on historic cost or book value representing money actually invested and presumably reflecting a fair average market value. There are however, cases where definite costs of timber are not clearly known, or if known, are no longer in keeping with any reasonable market value or the earnings and money available for depletion charges. For instance, timberlands may be acquired merely as a part of other assets, with no allocation of price paid, or properties might be merged with a reallocation to different mills and outlets. Under such conditions the definite cost or value is not readily at hand. Again, conditions might require a complete recasting of old values and costs and setting up of new values on which

new capital investments and depletions must be computed.

The United States Income Tax Law partially met this problem by allowing a timber owner to revalue his holdings as of March 1, 1913, as determined by the purchase and sale of properly comparable tracts. Such values were obtained by an analysis of sales of similar tracts offered by willing but not forced sellers, and acquired by able and willing buyers with the means to purchase. In effect this gave the owner of timberland of low book value, such as usually originates through old acquisitions, a chance to put himself in the same position in relation to his depletion as the purchaser who bought timber at the current market, for new values were thus established based on costs as of that date. Subsequent acquisitions, based on cost were to be averaged

with the revalued assets and the composite figure used as the basis for subsequent depletions.

This method based on fair market value is applicable to many things that can be definitely measured and defined and that have an active and stable market, such as improved real estate. It is limited in forest valuation, in that frequently tracts are acquired under new conditions or for special purposes that cannot be fairly compared to those older tracts. Again, under certain conditions markets disappear or change, so that the previous market value is no longer applicable. In such cases valuation may be approached by the method of analytic appraisal, which is based on the future earnings reduced to present worth. Analytic appraisal therefore requires an estimate of cost of production and sale prices over the future, a problem admittedly difficult even in normal times and especially so today. However, any investment running into the future must depend on the conditions the future brings forth, and analytic appraisal merely endeavors, by ascertaining the facts available today, to allow for these conditions.

An estimate of future earnings requires:

1. An analysis of the total quality of timber involved.
2. The net recoverable quantity which will be converted.
3. The duration of supply this quantity will give at average normal production, not 100 per cent of full rated capacity.
4. The full cost of conversion into the final salable product.
5. The average sale price expected over the years of calculated life.

The margin of sales over cost, or realization, as it is frequently called, is then reduced to present worth by discounting. In simple cases the cost of the plant minus any wrecking value, is deducted from present worth to arrive at the value of the timber only.

DISCOUNTING FUTURE EARNINGS—ALLOWANCE FOR RISK AND PROFIT

In discounting future realizations (or annual rentals as they may be termed) by ordinary interest rates, it is necessary to keep clearly in mind that this process will yield a figure of present worth which, if drawing interest at the same rate, will in the same period of time require all the annual realizations for its amortization. Thus, \$4.00 a thousand of realization on ten million feet annually for ten years totals \$400,000.00 in that period, and, discounted at 6 per cent, gives a present value of \$294,400.00. The annuity formula shows that \$294,400.00 at 6 per cent interest will be amortized, both principal and interest, by ten annual payments of \$40,000.00 each. In other words, the result of this 6 per cent discount to present worth is not the purchase price, as there is no allowance for risk or profit. To allow for risk, a higher discount rate than the financial interest may be used. If physical losses have been allowed for by reducing the expectation of timber available over the period, a discount rate of 8 per cent with money at 6 per cent might express the business risk.

The application of this discount rate may be further refined by the use of Hoskold's formula, which while discounting at a given rate to cover interest and risks reinvests at a lower rate of interest for conservatism. Where there are no unusual risks a rate of 8 per cent, with the sinking fund drawing interest at 4 per cent, is often used in mining practice. Included are tables giving Hoskold's discount factors for 8 per cent and 10 per cent, with reinvestment at 4 per cent. It will be noted that these are somewhat lower than the straight discount factors of 8 per cent and 10 per cent. Hoskold's discounts are also graphically shown in comparison with straight discounts in Figure 3.

Having allowed for risks, next comes the question of profit, or in other words, what part of the present worth is a justifiable purchase price. This to a great extent will depend on the special factors in each case. If the time is short and other hazards are low and the market advancing, and some special need is felt for the product, and nuisance and consolidation values are present, and plant depreciation is a factor, the purchase price finally justified may be fairly close to present worth. Under reverse conditions a much wider margin of profit is necessary. Profits, like risks, could be allowed for by a further increase in the discount rate (See Figure 3), but lump sum figures and unit profits are also useful.

The present worth figures which are hereafter used for comparative purposes would in practice be carefully weighed and reduced to determine the purchase price, for the purchase price will be the new investment which must be written off by depletions.

PLANT VALUE IN SIMPLE AND COMPLEX CASES

In the case of those forest products which involve but small enhancement of value through manufacture, such as logs, pulpwood or lumber, and where the residual or wrecking value of the plant is low, deducting the residual value of the plant from the present worth of the resource should give satisfactory results. In the manufacture of paper however, the cost of the mill may be several times that of the timber supply, and the residual value of the plant may be very substantial, though indefinite. Also, profits from the sale of the ultimate product are not entirely based on the wood, of which there is only five or six hundred feet in a ton, but are also derived from the intricate business management involving

woodlands, water power, manufacture and sale of a highly diverse, competitive product, together with the large financial and industrial problems this includes.

It would therefore seem more logical to treat the mill as a manufacturing venture in itself, whose risks, profits and fixed charges, including depreciation, interest and obsolescence, should be included in the cost of conversion. The realization over and above such inclusive costs, plus the full cost of delivery of logs (excluding of course, the value of the stumpage, for that is what is sought in this case), would then become the primary measure of timber value.

VARIATIONS OF PRESENT WORTH

In the following examples, such realizations have been assumed for brevity but they bring out some very astonishing comparative results when the timber is considered in the light of its particular utilization. These may be very different from any results obtained by the purchase and sales methods, or other approaches to the problem of valuation, such as capitalized cost or replacement value.

Let us consider that a tract is to be acquired in connection with various other extensive assets and intangibles. Under such conditions new values must be set up, as the tract will furnish new sources of supply to the purchaser's present plants A and B. Plant A we may further assume is an old sawmill whose present supply is pretty well exhausted and available only in sufficient quantities for a small and unprofitable operation. This old plant however, still stands on the books at \$50,000.00.

A close survey of the timber in this new tract reveals there are 300,000 M feet tributary to Plant A. Much of it is in poor stands, difficult of access, with far higher than ordinary logging costs. It is exposed to heavy fire risks and

much of the timber is unavailable, so that the recoverable quantity is estimated at only 210,000 M or a seven years' supply at normal rate of production of the saw-mill, which is about the useful life of this plant. \$1.50 per M on 30,000 M feet, or \$45,000.00 annually, is the estimated realization. The present worth of these seven yearly revenues by Hoskold's formula at 8 per cent and 4 per cent is \$217,600.00. From this we may deduct the \$50,000.00 value of the old plant, which has no wrecking value, leaving approximately \$167,000.00 present worth of the recoverable timber, or 80 cents per M.

That part of the new tract tributary to Plant B (referred to hereunder as tract B), is purposely set forth for greater contrast. In this case the depreciated value of the plant, a 250 ton paper mill, so designed however as to permit cheap doubling of capacity, remains on the books at \$4,500,000.00. After thirty years when the timber at present comprising its supply is exhausted, further supplies except from Tract B are obtainable only by long shipments, which would raise the price of wood to a point where profits would be questionable or impossible. The mill has long been regarded as highly profitable, and present realization is at the rate of \$4.00 per M after allowing suitable profits to the mill as a venture itself.

Analysis of data for Tract B shows an excellent stand also totaling 300,000 M feet, with large areas of merchantable timber still thriftily growing, with low risk of loss and with favorable conditions for cheap logging and quick delivery, which are entirely comparable to the existing thirty years' supply. If however, the tract is not to be operated until the present supply of thirty years is exhausted, then, due to the low losses and unusually good growth, it is estimated that some 400 million feet will be available, or say conservatively ten years' addi-

tional supply at 35 million a year which is the average requirement of the mill.

The present worth of the existing 30 years' supply (with \$140,000.00 per year realization and using Hoskold's formula at 8 per cent and 4 per cent), is \$1,430,800.00 or nearly \$1.35 per M for the 1,050,000 M feet to be converted in that time. The total 400 year supply (i.e. including Tract B) discounted on the same basis will yield a present worth of only \$1,547,000.00. The value of the additional supply under these conditions may be taken as represented by the difference in these figures, or \$117,200.00, equal to 35 cents per M on the estimated 350,000 M, and less than the inferior stand tributary to the old sawmill (i.e. Plant A), though of far greater recoverable volume and with better logging conditions and used in a highly profitable plant, thus showing the effect of discounting over a considerable period of time.

Let us now consider Tract B as a reserve sufficient to warrant doubling production in the paper mill for a period of 20 years from the present time, and that economies of increased production will offset higher depreciation charges for this shorter time, so that realization still remains at \$4.00 per M.

Average production is now estimated at 70,000 M feet and the realization is \$280,000.00 annually. The present worth of this rental for 20 years by Hoskold's formula, using 8 per cent and 4 per cent, is \$2,464,000.00, or \$1.75 for the grand total of 1,400,000 M feet to be realized in 20 years, as against the \$1.35 for the 30 year utilization, or 40 cents more. However, if increased production and the capital expenditure it requires are only warranted by the enlarged supply of pulpwood, then we might consider that the increase in present worth to \$2,464,000.00 for a 20 year period is only made possible by the acquisition of Tract B. Deducting from \$2,464,000.00 the present

worth of the existing supply on a 30 year basis (\$1,430,800.00) gives \$1,033,200.00, or \$3.50 per M for 350,000 M feet estimated to be available within the 20 year period. This value reflects the increase in present worth obtained by shortening the period of conversion of the original supply, but is only warranted on the assumption that the increased value is solely dependent upon acquisition of the additional timber.

The foregoing illustration of the variation in value from 35 cents to \$3.50 for the same timber used in the manufacture of the same product, depending only on the time of conversion, shows the necessity of careful consideration of the specific objects for acquiring reserve timber, especially for long periods, as such reserves may not be obtainable at prices which reflect their low present worth for future use.

It is for this reason that close wood utilization and salvage recovery, more efficient fire protection and encouragement of growth by all practical methods, may within certain limits, increase a present reserve more cheaply than the investment of additional capital for new timber.

CAPITALIZED COST

Another interesting result is obtained by capitalizing the interest and carrying charges on this area. Assume that the entire tract was purchased for the moderate sum of \$600,000.00, which might be indicated by a fair market valuation, and \$150,000.00 allocated to the sawmill timber, leaving \$450,000.00 in the paper mill reserve. With interest at 6 per cent and with carrying charges, ground rents, taxes and fire protection at the low figure of \$4,000.00 per year, the annual burden is \$31,000.00, which, in the thirty years the area is expected to be held, will have increased the principal to \$2,585,000.00 and accumulated carrying charges of \$316,-

000.00, a total of over \$2,900,000.00. This is more than \$7.00 per M on the stand, augmented by growth and nearly \$10.00 per M if the original stand had been mature and in equilibrium.

Even in the above favorable instance, the carrying charges may have mounted more rapidly than value, and be of little or no use in determining it. This is due to the unfortunate fact that the rate of growth of most northern timber is not as rapid as the accumulation of even very moderate interest charges, and an increase in stumpage values must be relied upon to make up this difference.

In the past such increase in stumpage values has often been tremendous, and there are cases where standing timber has advanced 30-40 times its purchase price in as many years. Such rises however, were from a very nominal base and cannot be expected to continue, as timber values become more and more stabilized in the future.

Thus, while capitalized cost and carrying charges have often been realized by the timber holder, particularly where tracts were acquired in the early periods of exploitation, they are not necessarily a measure of value or what the ultimate purchaser will pay and what cost and depletions he should determine.

It is not within the scope of this paper to discuss compound interest or the fantastic results its use may be made to yield. Some authorities consider interest as a cost of doing business, to be charged off annually, the effects of which policy can be clearly seen in the foregoing example of capitalized costs.

Analytic appraisal and its attendant use of interest is necessary in the study of forest investments in comparison with other types of investments, and also to determine their nature and extent and their relation to plant investment and utilization and to the protective maintenance measures that are financially justi-

fiable. Depletion is merely the orderly return or writeoff of this investment once it has been made.

FINANCIAL LIFE AND ROTATION PERIOD

The complete rotation of a northern pulpwood forest which may be set at perhaps 70-80 years, does not need a forest capital of 70-80 times the annual require-

TABLE 1

PRESENT VALUE OF AN ANNUAL RENTAL DISCOUNTING AT 8 PER CENT AND 10 PER CENT AND REPLACING CAPITAL BY REINVESTMENT AT 4 PER CENT

HOSKOLD'S DISCOUNT FACTORS

Years	8 per cent	10 per cent
1	.92	.91
2	1.75	1.69
3	2.50	2.38
4	3.17	2.98
5	3.78	3.51
6	4.33	3.99
7	4.84	4.41
8	5.30	4.79
9	5.73	5.14
10	6.12	5.45
11	6.49	5.74
12	6.82	6.00
13	7.13	6.24
14	7.42	6.46
15	7.79	6.67
16	7.95	6.86
17	8.18	7.03
18	8.40	7.19
19	8.61	7.34
20	8.80	7.49
21	8.99	7.62
22	9.16	7.74
23	9.32	7.85
24	9.47	7.96
25	9.61	8.06
26	9.75	8.16
27	9.88	8.25
28	10.00	8.33
29	10.11	8.41
30	10.22	8.49
31	10.32	8.56
32	10.42	8.62
33	10.51	8.69
34	10.60	8.75
35	10.67	8.80
36	10.76	8.86
37	10.84	8.91
38	10.91	8.96
39	10.98	9.00
40	11.05	9.05

ments, due to the volume increment over the long periods involved. A reasonable approach however to a sustained yield, such as may be approximated by a simple application of Von Mantel's formula, which assumes that growth will equal the present stand over a rotation period, does show a span of financial investment of say 40-50 years, which is longer than that obtaining in many other industries. This fact however is not necessarily an argument against the building up of a sustained supply, particularly in Eastern Canadian pulpwood forests, where cost and carrying charges are low and the plant investment heavy.

On the other hand, maintenance of a sustained supply does not take the place of the writeoff of the capital invested in the forest, through adequate depletion charges. Rather it seems to me, because of the importance of a stabilized paper industry to Eastern Canada and of its product to the United States, that this very element of future time necessitates a profit today sufficient to return the invested capital in the not too distant future, so that the industry will enter upon that future with its forest resources largely unencumbered and unimpaired.

ANNUITY FORMULA

P—principal

p—rate of interest

A—annual sum to be set aside

n—number of payments

$$A = \frac{Px.op}{1 - \frac{1}{(1+op)^n}}$$

SINKING FUND FORMULA

P—amount to be amortized

p—rate of interest on sinking fund

A—annual payment to sinking fund

n—number of years

A =

Px.op

$$(1.op)^n - 1$$

Present worth of future rentals with a risk and sinking fund at different interest rates. (Hoskold)

V—present worth

P—annual realization

r—risk rate

p—sinking fund rate

n—number of years realizations will be received

V =

P

$$.op + .or$$

$$(1.op)^n - 1$$

CAPITALIZED COST AND CARRYING CHARGES

P—cost or purchase price

p—rate of interest

e—annual expenses

n—number of years

A—total accumulated charges

$$A = P \frac{(1.op)^n + e (1.op^n - 1)}{.op}$$

Reference may be made to Chapman's "Forest Finance" for tables giving values for 1.op for varying rates and years. Also to "Forest Valuation" by the same author.

CONVERSION FACTORS—DOUGLAS FIR CORDWOOD

Studies made on old growth Douglas fir cordwood in the autumn of 1933 in the vicinity of Molalla, Oregon, have aided in the establishment of conversion factors heretofore unavailable. Measurement of 52 cords as piled in the woods by the cutters (48 inches wide, 52 inches high and 8 feet long) showed a solid wood and bark content of 91.5 cubic feet per cord. The individual pieces were all split wood, varying in cross-section from triangles and sectors to squares. They numbered 64 to 103 pieces per cord, averaging 82. The end area of the average stick was approximately 40 square inches.

From 68 to 80 per cent, averaging 74 per cent, of the total tree volume including bark, was converted into cordwood in 14 relatively sound trees. An average of 3 per cent of the total tree volume remained in stumps and 23 per cent in unused tops. Stumps were cut high only when pitchy or showing distorted grain. Tops were utilized to the first bad falling break or large limb.

A factor of 121 was indicated for reducing total tree volume, including bark, into cord volume, and a factor of 103 for reducing volume table figures, showing cubic feet without bark, into cords with bark. Further studies in other tracts may modify these tentative results.—J. E. LODEWICK and H. M. JOHNSON, *Pac. N. W. For. Exp. Sta.*

THE TENNESSEE VALLEY—A CHALLENGE TO FORESTERS

By EDWARD C. M. RICHARDS

Chief Forester, Tennessee Valley Authority

Where other governments have undertaken large-scale regional planning of land use, the enterprises rest on absolute dictatorship, and the use of coercion. The Tennessee Valley project is an attempt to accomplish the same end through coöperation and uncoerced action, and in accord with truly American democratic principles. As the title to this article implies, the undertaking has an especial appeal to the forester since so much of the land is not needed for agriculture and will play its proper part in the coördinated scheme only if it continually produces successive timber crops or its forest recreation values are adequately developed, and since, furthermore, the need for flood control and erosion correction require such widespread maintenance of protection forest cover. The T. V. A. is indeed one of the major forestry undertakings of the New Deal.

ALL of the people of the United States and many people in foreign countries are looking at and to the Tennessee Valley today. It is one of the chief points of interest in our country, and often is front-page news. The reasons for this are many and interesting from various points of view, but the outstanding fact is that the Tennessee Valley project has gripped the attention, raised the hopes, and inspired the devotion and determination of a wide variety of men and women in all parts of the world.

Through the mere appeal of a great idea coupled with high ideals, the whole enterprise headed by the Tennessee Valley Authority is making men think and wonder. In reality, this cannot fail to be the case when the underlying principles and ideals of the great idea are considered, because this is the first time in modern history that any democratic government in the world has undertaken to set aside the entire watershed of a great river and all its tributaries, totaling nearly twenty-six million acres of land, for the purpose of a single, unified experiment in regional planning on a gigantic scale. Furthermore, not only is this a large experiment, but it is also a permanent enterprise. Unfortunately, the idea has sometimes been conceived that the

Tennessee Valley project is a temporary relief measure. This is not the case at all. Rather, the project represents a permanent undertaking headed by the federal government, in friendly, uncoerced coöperation with the states and local governments and with private individuals, in a systematic attack upon the problem of bringing the whole economic life of a region into coördination and of permanently setting up a plan for its constructive management.

Other governments, such as the Soviet government in Russia and the Fascist government in Italy, have undertaken large-scale regional planning as the way out of many of the problems of land use. But in each case, the enterprises rest upon an absolute iron-clad dictatorship, and the more or less ruthless use of coercion. The Tennessee Valley project, on the other hand, is the first shining example of attempting to do the same thing through coöperation and uncoerced action.

For this reason, the Tennessee Valley project is of tremendous interest not only to the people in, or bordering on, the Tennessee Valley, not only to the people of the United States, but also to the lovers of freedom and democracy throughout the world. It represents, therefore, not only an adventurous effort in the direc-

tion of large-scale planning, but it also sounds a clarion call to all those believers in the democracy of Thomas Jefferson, of George Washington, and of all the other founders of our country.

To the technically trained forester more than to most people, the general idea behind the Tennessee Valley Authority carries a great appeal. The reasons for this are not difficult to find. Let us glance at some of them.

Perhaps more than any other group of men, the technically trained foresters tend to think unconsciously along the lines of long-time planning in the building up and management of a natural resource—the forest. Forests take a very long time to grow, humanly speaking, and the forester has been trained to think accordingly in terms not only of decades or generations, but even of centuries in the handling of forests. Therefore an enterprise which undertakes to plan far into the future appeals to the technically trained forester very strongly. It is natural for foresters to find themselves dyed-in-the-wool TVA'ites.

A second reason why the Tennessee Valley project has an appeal for foresters is that throughout the whole world foresters have to consider the control of floods as one of their most important functions. In the Tennessee basin the necessity for controlling floods fits right into the technically trained forester's scheme of things.

A third reason why the technically trained forester is interested in the Tennessee Valley project is because of the necessity of prevention of soil erosion, in order to protect the expensive power plants and dams from silting. While engineering works aim to take care of the waters after they reach the streams, the technically trained forester sees the point that half of the battle against soil erosion, and also against floods, is on the upper slopes of the streams, and in the control of water before it gets into the streams.

This is accentuated by the fact that in large part the permanent prevention of soil erosion depends upon the proper management of the vegetative cover of the watershed of a river basin. This means that the proper control of soil erosion calls not only for men trained in engineering to construct check dams in gullies, but also for men trained in the establishment, maintenance, and management of vegetative cover, and this, of course, is exactly what the forester is trained to do.

A fourth reason why the technically trained forester is interested in such an enterprise as the Tennessee Valley Authority is that the Authority plans to coordinate and correlate the use of lands in the Valley with industries. While the agricultural economists in this connection are keenly interested in bringing about a proper relationship between agriculture and industry, the technically trained forester realizes that a considerable proportion of land in the United States is for one reason or another unnecessary for the production of agricultural crops. In fact, the figures show that we have too many acres now being farmed. This leaves a large area of the country which cannot be properly farmed, but which must be taken care of properly, if floods and soil erosion are to be prevented. At this point the technically trained forester comes into the picture as the logical person to take over the management of such low-grade, depleted, isolated lands, or those which are otherwise unsuited for farm crop production, and work out uses for them which will be of value to society. While the amount of such land in the Tennessee Valley has not yet been determined, there is unquestionably a great deal of it in various sections. The forester therefore sees here an opportunity to demonstrate his knowledge and ability in working out forms of uses for these areas which will maintain vegetative cover, and hence tend to prevent erosion and

floods, and at the same time produce something of value to the people in the Valley and in the country as a whole.

This, of course, does not include such areas as will prove to be of value for grazing purposes, and which therefore can be held in a form of agricultural use for the raising of cattle and the production of dairy products and meat, all of which work falls under the category of the agricultural economist's field.

In approaching the use both of the lands which should be taken out of agriculture and the lands which, for soil erosion purposes or flood control, should be kept in forests, the Tennessee Valley forester evidently has a very wide field of possibilities open to him. For instance, the possibility of profitable timber production on a large scale is of great importance. In various parts of the Tennessee Valley, some of the most valuable timber trees, both of hard wood and soft wood species, to be found anywhere in the United States, find their natural range. The organized management of forests for the production of saw timber, pulp wood, chemical wood, and other products certainly should find its place in the forester's program in the Tennessee Valley.

Another use for non-agricultural lands under the direction of the technically trained forester is that of public recreation, including wildlife, hunting, fishing, camping, and so forth. At first glance, perhaps, such forms of use do not appeal very strongly from the point of view of money-making enterprises, but on further consideration the possibilities in this field from the economic point of view far exceed what most people would expect. The systematic management of hunting in the State of Pennsylvania, for example, now has been brought to the point where the five hundred and fifty odd thousand hunters in the state pay over one million dollars annually for hunting licenses, and

in return for this they shoot over eight million dollars' worth of game. Again, the national forests which are managed under the direction of the U. S. Forest Service had more than thirty million visitors last year, most of whom fell into the categories of hunters, fishermen, campers and tourists. All of these out-of-door recreationists naturally spend money, so that the sum total exchange of cash which takes place on account of the recreational use of these lands mounts up to a very high figure each year. The development of the recreational use of our forests is important from the standpoint of the welfare of the people of the country, who, because of ever-increasing developments in transportation facilities by automobile and airplane, and because of the increasing tendency toward additional leisure time, are depending more and more upon such recreational opportunities. To put it concretely, the establishment of the inter-park highway between the Shenandoah National Park and the Great Smoky National Park will unquestionably tend to direct many automobile tourists from the North down into the eastern edge of the Tennessee Valley. The presence of great dams and power projects, such as the Wilson Dam, the Wheeler Dam, and the Norris Dam, will naturally draw such tourists down into the Valley itself. The forester can therefore look forward to the time when he will have the chance of furnishing outdoor recreation of all sorts to visitors to the Tennessee Valley. If handled properly in the interests of all, this can be made to result most favorably for all concerned.

As the technically trained forester looks at the forester's job in the Tennessee Valley, he sees an almost unlimited field for development along the very best and most useful lines which his profession has to offer. Naturally, however, when faced with such a stupendous enterprise, he

knows that nothing can be accomplished without the hearty coöperation not only of the people in the Valley and around it, but also of all those agencies interested in forest industries and recreation. Here the Forestry Division of the Tennessee Valley Authority has much to be thankful for, because of the existence of so many agencies working along the same lines, which have shown every willingness to help in the great task. It is one of the most encouraging and happy factors that has come to the attention of the foresters of the Tennessee Valley Authority that from the U. S. Forest Service, the National Park Service, the U. S. Bureau of Indian Affairs, the state forestry departments of all the states concerned, together with many of the other interested organizations, such as the organized hunters, fishermen and sportsmen in the different states, the Appalachian Trail clubs, and other public-spirited groups of citizens, the heartiest coöperation and help have been forthcoming. In fact, up to date,

the friendly interest and coöperation shown by the public generally in the whole idea of making forestry and soil erosion prevention an outstanding success in the Tennessee Valley has been splendid, and has had the effect of strengthening the hands, stimulating the minds, and calling forth the most devoted work in this direction on the part of the foresters in the Tennessee Valley Authority. It is truly inspiring to see the whole-hearted way in which this important phase of the Tennessee Valley project has been grasped and approved and supported by the people of this great river basin. Let me take this opportunity, therefore, of saying publicly that the foresters of the Tennessee Valley Authority would like to go on record as being most grateful and happy in the support which they have received on all sides, and as this support is continued and developed, there is every indication that President Roosevelt's great vision of the Tennessee Valley project will be immensely aided in its fulfillment.



Our laws of land ownership should be changed so that if a man is handling his land in a way that will destroy it, the part he can not take care of should be taken away from him and given to someone who will farm it properly, or be planted by the government to some growth that will prevent soil erosion. A man has no natural right to inherit good land and pass on a waste of gullied hillsides to those who come after him. We are not complete owners of the soil, but only trustees for a generation.—ARTHUR E. MORGAN, *Survey Graphic*, Jan., 1934.

BRIQUETTE PLANTING

By S. O. HEIBERG

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Briquette planting is a mechanized form of ball planting. This form of planting has not been used in American forestry, although commonly employed in planting of ornamental trees. It has, with good reason, been considered too expensive. In European forestry, on the other hand, ball planting, even though costly, finds rather wide use.

ALL planting consists of planting stock from which the soil has not been removed. The plant is lifted, transported, and planted with a smaller or larger "ball" of soil still attached to the roots. Many different tools have been developed to facilitate lifting and planting balled stock. In forestry practice, ball planting is used most frequently in connection with natural reproduction which in places is too thin or too thick. Small blocks of plants or individual trees are lifted from thick spots and planted where they are most needed. Under such conditions ball planting might often pay because it is cheaper to handle the stock already on the area rather than to go outside and bring in stock of other origin. The chief advantage of ball planting is its dependability. The roots, if the plants are properly lifted, are hardly damaged; they are never exposed to the weather, and—perhaps the most important—are planted in their natural position and with the soil to which they are adapted.

The drawback to the method is the cost of transporting the large amount of soil, which, under all circumstances, is expensive to handle. During the last decade several modifications of the method have been developed with the purpose of retaining the valuable "ball" idea while at the same time, the costs are cut down. The first attempt in this direction, so far as can be found, was made by the Swede,

N. Berner. He constructed cardboard containers in which the plants could be grown until set out. The cardboard was impregnated to avoid rot and perforated to equalize moisture conditions during the period in which the cardboard boxes stood closely packed with soil and plants before being planted out. This also facilitated the spread of the roots after planting, and before the cardboard wall disintegrated. While this method is a big improvement over common ball planting, it still proves to be expensive for large scale operations.

The next step forward was taken by the Norwegian forester, A. Bakken, who for several years had experimented with ball planting. He made small soil cubes or briquettes by hand and made them stick together by paraffining them. In co-operation with an engineer, an elaborate machine was constructed which could produce these planting briquettes on a commercial scale and at low cost. The capacity of the machine is about 2000 briquettes per hour. Ordinary good nursery soil is fed into the machine and pressed to cubes about $1\frac{3}{4} \times 1\frac{3}{4}$ inches in size. Two to three seeds are placed on one side of the cube and covered with soil and the briquette is dipped into paraffin so that all the sides, with the exception of the surface, are protected and held together by a layer of paraffin. The briquettes are finally placed in a frame with wire bottom, and are now ready for shipment.

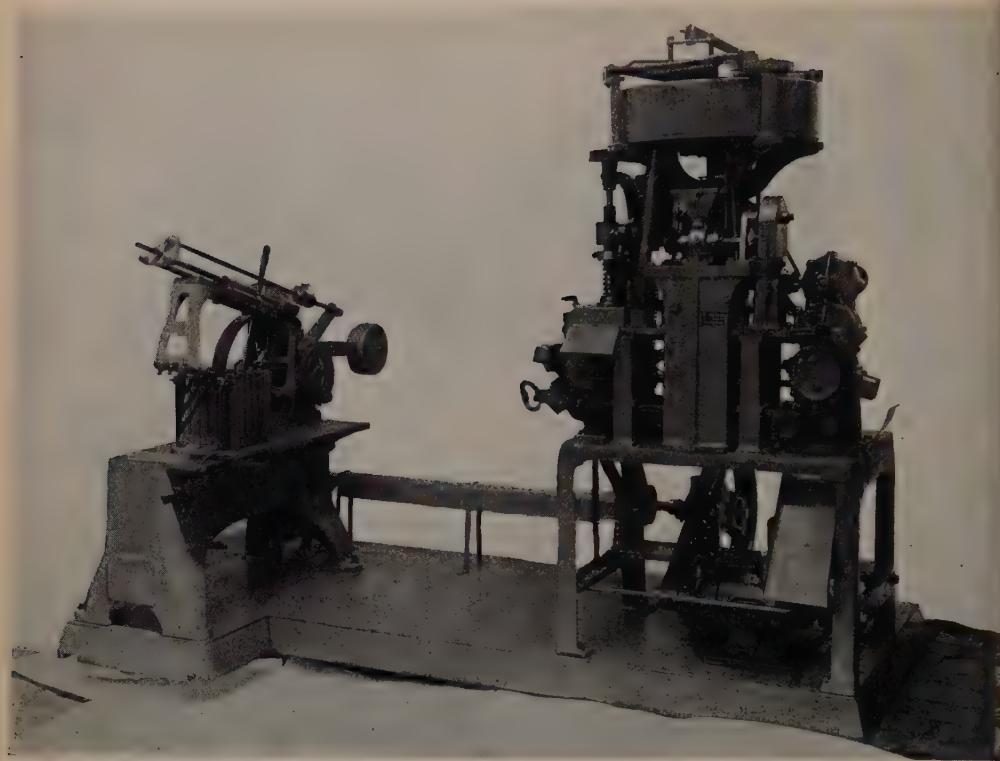


Fig. 1.—The Thorkildsen briquette machine



Fig. 2.—Note the frame with briquettes and the special planting tool

These briquettes can either be set out directly in the field by means of special tools which have been constructed for their rapid planting, or they can be kept under conditions which are most favorable to germination of the seed and then set out later when convenient. If kept under the climatic condition of the planting field they can be planted any time during the year when the ground and labor conditions permit. Leaving them in the frame for some months so that the seed may germinate and the seedlings start growth has also the advantage that they can easily be watered during a drought period, and the failed briquettes eliminated. It is necessary with this small size of briquettes that they be planted out when not older than one year, as the roots otherwise will break through the paraffin. The initial cost of a briquette is about one-fourth cent. The setting of the briquette with the special planting tool furthermore is quicker than ordinary planting.

The disadvantages of this method are several. Even though much less soil is transported than in ordinary ball planting, there is still quite a large weight and volume compared with naked-rooted plants. The briquettes are apt to break or dry out during long transportation. Furthermore one-year seedlings cannot compete with other plant growth under all field conditions. In many cases it will be necessary to plow a clear furrow and then to plant in this so that the weeds will be hampered for the first few years.

Some of these difficulties have been overcome by another Norwegian, G. Thorkildsen, who also has constructed a machine for the production of plant briquettes. (See Figure 1.) His briquettes are somewhat larger and consist of a peat turf, which is hollowed and filled with soil. In this the seedling is grown. The briquettes stick together better and the

trees can be grown in the briquettes until they are a few years old before they are set out. Thorkildsen also has a special tool to facilitate the field planting. (See Figure 2.)

These various modifications of ball planting are so new that it is impossible as yet to judge their practical value for forestry. The survival figures thus far obtained vary widely and seem to indicate that the methods hardly have passed the experimental stage. There is, however, a great deal of promise in the methods. Planting of naked-rooted plants has never been entirely satisfactory. The roots are in the majority of cases curled, twisted, and deformed during transplanting in the nursery and in the field. It is possible even in old plantations to note how the roots were mistreated through the planting many years ago. This is overcome in briquette planting. The roots develop in their natural position and never get the severe shock which usually results from transplanting.

Even if the cost of a briquette is low, the transportation of it must necessarily be rather high and involves risk. This difficulty could in some cases be overcome by moving the machine by truck to the planting field or its near vicinity, and by then producing the desired number of briquettes in the field. They should then be left in the frames under proper conditions until they have reached the desired size for planting. A large temporary force to do the planting would be unnecessary, because the briquettes could be set in the ground over a much longer period of the year than is the case with naked-rooted plants. Local experienced and permanent labor can be used for this job.

Experimentation with the briquette method is apt to be expensive, as only the original machines have been built.

Briquettes cannot be imported, as the importation of unsterilized soil from other continents to America is prohibited and sterilization would, of course, kill the seed or the plant. The idea behind the method is worth while and can perhaps be fitted into the large scale reforestation projects in operation in many parts of the country. Perhaps the pot idea will prove to be the best, provided the pots can be made at sufficiently low cost. They should be made filled with soil and sown automatically by a machine. It

would be necessary that the wall be made of material low in carbohydrates as pots walls rich in carbohydrates, such as poorly decomposed straw, result in multiplication of soil bacteria and fungi which temporarily utilize the available nitrogen of the soil thus competing with the plants. The pots should be set out in cultivated strips rather than in plowed furrows. Such cultivated strips can be made now for \$1 to \$2 per acre, spaced six feet. A machine may be constructed to set the pots in the strips.



The County Forestry Department bows to the lowly bee and the honey industry of southern California.

During the past several years the Los Angeles County Forestry Department has been experimenting with the native California Buckeye as a possible tree for use in reforestation activities following a fire in our watersheds. After many experiments it was found that the tree was well worthwhile to include in such a program because of its resistance to drought and its ability to reproduce by root sprouts after a fire.

Following the fire of last fall near La Crescenta, plans were laid to broadcast wild mustard seed over the burned area and also plant seed of various tree species in order to prevent erosion and reproduce the watershed cover as soon as possible. The buckeye was included in this plan; however, it has just been learned authentically that the flower of the buckeye is poisonous to bees and since the bee industry of Los Angeles County is important and large, the Forestry Department has decided to abandon the use of this tree in its reforestation activities. This was done as a coöperative measure with the Agricultural Commissioner and the bee industry. Such a step should be welcomed by the owners of bee colonies because this tree normally has a natural range in central California and exists as far south as the Liebre Mountains.

However, it will not be brought into Los Angeles County for reforestation purposes and thus create a great loss to bee owners.—J. E. PEMBERTON, *L. A. County Forestry Dept.*

DEGREES GRANTED, ENROLLMENTS AND RECENT DEVELOPMENTS AT THE FOREST SCHOOLS IN THE UNITED STATES 1931 TO 1933

By CEDRIC H. GUISE

Department of Forestry, Cornell University

This article supplements and brings up to date material which appeared in the Report of the Forest Education Inquiry, "Forest Education."

THE Report of the Forest Education Inquiry¹ published late in 1932 contained statistical material bearing on the enrollments and numbers of degrees granted from the various forest schools in the United States, between the year 1902 and 1931.

Inasmuch as current trends in enrollment and the numbers of foresters graduated are of interest particularly to those in the educational fields, and in general to the members of the profession at large, it seems wise to continue at frequent intervals the presentation of statistics from the various schools covering enrollments, and numbers of degrees conferred and also the facts of importance in the general field of forest education. This presentation follows for the period September 1931 to September 1933 inclusive. It adds to the material in the Inquiry's Report and completes it through September 1933.

The data which follow were obtained recently by circularizing the forest schools, each of which coöperated by sending the material requested. Reference will be made to the Report of the Inquiry in order that the tabular material therein may be continued to the present.

Table 13 of the Inquiry's Report shows the numbers of degrees granted for completion of work at the forest schools in the United States from 1902 through June, 1931. In this table there are listed 4,199

undergraduate degrees and 1,172 master's degrees. Thirty-four degrees of Doctor of Philosophy are also listed in the text of the report. The statistics for 1931 included those through June of that year. A small additional number were conferred in September, 1931, 13 undergraduate degrees and 5 master's degrees. No doctorates were reported as conferred in September, 1931. Therefore the 1931 figures in Table 13, when increased by the degrees conferred in September, 1931, should show 394 undergraduate degrees, and 97 master's degrees and the totals should be increased to 5,212 and 1,177 respectively.

In the calendar year 1932 there were conferred 380 undergraduate degrees, 78 master's degrees and 7 doctorates. In 1933 these numbers were 355, 65 and 6 respectively. The total number of degrees conferred through the calendar year 1933 are as follows: undergraduate degrees 5,947, master's degrees 1,320 and doctors of philosophy 47.

The numbers of degrees conferred by each of the forest schools of United States in 1932 and 1933 are shown in Table 1.

The numbers of degrees granted for completion of work at all the forest schools in the United States by the calendar years 1902 to 1933 are shown in Table 2.

¹Forest Education, Henry S. Graves and Cedric H. Guise, Yale University Press, New Haven, 1932.

The New York State Ranger School reports that 42 men completed their year of training in 1932, and 32 men in 1933. These numbers are within the numerical range for each of the last few years.

Inasmuch as the 5,947 does not include the 15 men who received the degrees of Forest Engineer from the former New York State College of Forestry at Cornell, nor the men who received degrees from other forest schools of university grade now discontinued, the total number is undoubtedly over 6,000. Nor does it include the men who received their training at the Biltmore Forest School.

Table 1 is of interest primarily as it indicates the numerical extent to which the individual schools train men for the

profession of forestry. An inspection of Table 2 is of greater interest in that it indicates the present trends in the numbers of men being trained. The largest number of undergraduate degrees was conferred in 1931 (394), although the number (380) in the following year was almost as great. A decline took place in 1933, but inasmuch as this is small and for one year only, it is impossible to tell whether or not this is the start of a general trend. It does appear, however, that the 394 undergraduate degrees conferred in 1931, is a maximum which probably will not be attained again. The unusual prominence given to forestry during the last year will presumably have a certain influence on the numbers of men entering

TABLE 1

NUMBERS OF DEGREES GRANTED FOR COMPLETION OF STUDIES AT FOREST SCHOOLS IN THE UNITED STATES
FOR THE CALENDAR YEARS 1932 AND 1933

Forest schools	Undergraduate degrees 1932	Undergraduate degrees 1933	Master's degrees 1932	Master's degrees 1933	Doctor's degrees 1932	Doctor's degrees 1933
California	18	18	1	4	—	—
Colorado State	14	14	—	—	—	—
Colorado College	3	4	—	—	—	—
Connecticut	—	13	—	—	—	—
Cornell	21	16	2	5	1	—
Duke	—	—	—	3	—	—
Georgia	6	7	1	1	—	—
Idaho	11	12	4	2	—	—
Iowa	11	19	2	3	—	—
Harvard	—	—	3	—	—	1
Louisiana	9	2	—	—	—	—
Maine	24	21	—	—	—	—
Michigan State	18	14	1	—	—	—
Michigan University	21	14	10	11	2	1
Minnesota	31	32	3	3	—	—
Montana	19	10	—	—	—	—
New Hampshire	4	5	1	—	—	—
North Carolina	11	8	1	—	—	—
Oregon	34	24	2	3	—	—
Pennsylvania State	18	25	—	2	—	—
Purdue	9	7	—	—	—	—
N. Y. State College of Forestry	66	58	14	6	—	1
Utah	6	6	—	—	—	—
Washington State	5 ¹	4 ¹	—	—	—	—
Washington University	21	22	7	7	—	—
Yale	—	—	26	15	4	3
Totals	380	355	78	65	7	6

¹For completion of course in Range Management.

the forest schools. However, enrollment statistics, to be presented later, indicate no increase for the fall of 1933.

The greatest number of master's degrees (97) was conferred in 1931. An apparent decline has set in for the last two years, but the 65 degrees for 1933 is not a figure that is comparable to those of other years. Several schools, Yale, Harvard, California and Michigan, reported figures for 1933 which were considerably less than those of recent years, the reason being that men who normally would have obtained their master's degrees, left college prior to graduation in order to accept employment as foresters in the Civilian Conservation Corps. These men will for the most part, no doubt, make arrangements to complete the work for their higher degrees. Had not the opportunities for placement occurred in the spring of 1933, it is probable that the 1933 figure would have been at least comparable to that of 1932.

With regard to the number of doctorates, it may be noted, that of a total of 47, 13 were conferred in the last two years. Although the numbers for the present will continue to be small, particularly because of placement opportunities in public service, there is every likelihood of a sustained production of a small number of men with the degree of Doctor of Philosophy or Doctor of Science.

The undergraduate enrollments at all forest schools increased steadily to the year 1931-32, when 2,573 undergraduate students were reported. In 1932-33 the number dropped to 2,388, although this is well above the enrollments for 1929-30 and 1930-31, which were 2,123, and 2,120 respectively. These figures include a small number enrolled as special students. In the Report of the Forest Education Inquiry, the last figure given was for the year 1930-31, the highest point in en-

rollment to that time having been reached the previous year 1929-30. The total undergraduate enrollment for the first term of 1933-34 was 2,246.

There has been more or less interest as to the effect on forest school enrollments due to the prominence given to forestry since last March. This would undoubtedly be reflected in the enrollments in the freshman classes for the current year. The total number of freshmen reported is 775. The number for 1931-32 was 964, and for 1932-33 it was 811.

TABLE 2

NUMBER OF DEGREES GRANTED FOR COMPLETION OF STUDIES AT FOREST SCHOOLS IN THE UNITED STATES FOR THE CALENDAR YEARS 1902-1933

Years	Undergraduate degrees	Master's degrees
1902	—	9
1903	1	14
1904	4	29
1905	9	34
1906	23	24
1907	18	27
1908	31	35
1909	47	44
1910	61	48
1911	100	61
1912	122	54
1913	136	37
1914	151	42
1915	124	35
1916	151	36
1917	160	27
1918	65	10
1919	53	6
1920	160	25
1921	126	26
1922	141	44
1923	217	31
1924	215	43
1925	280	44
1926	259	58
1927	263	50
1928	302	64
1929	291	54
1930	308	69
1931	394	97
1932	380	78
1933	355	65
Totals	5,947	1,320

The above figures show that there has been a decline in the entering classes for each of the last two years, accompanied by a decline in the total undergraduate enrollments at our forest schools. It seems reasonable to assume therefore that the publicity being given to the conservation and forestry program has not stimulated a rush on the part of secondary school students to enter the profession of forestry. This is unquestionably a good thing for forestry. If the profession of forestry is to be called upon to take a more important part than heretofore in the management of publicity and privately owned forest lands, there will be ample

men available, without stimulating our schools to greater productive capacity. The quality of the men will be decidedly more important than the numbers graduated.

The Forest Education Inquiry did not obtain the statistics of enrollments of graduate students in forestry prior to 1930-31. During that year there were 138 men enrolled as candidates for the master's degree. In 1931-32, there were 173 enrolled, and in 1932-33 there were 174. However, in each of these totals were included the statistics for California of 29 and 33 men respectively, which were unclassified with respect to the candidacy

TABLE 3

ENROLLMENT STATISTICS AT FOREST SCHOOLS IN THE UNITED STATES FOR YEARS 1931-32, 1932-33, AND FIRST TERM 1933-34

Forest school	Numbers of Students											
	Undergraduate			Graduate, masters			Graduate, doctors					
	1931	1932	1933	1931	1932	1933	1931	1932	1933	1932	1933	1934
1932	1933	1934	1932	1933	1934	1932	1933	1934	1932	1933	1934	
California	105	132	126	29 ¹	33 ¹	7	—	—	—	—	—	6
Colorado State	138	144	135	—	—	—	—	—	—	—	—	—
Colorado College	8	5	1	—	—	—	—	—	—	—	—	—
Connecticut	30	32	26	—	—	—	—	—	—	—	—	—
Cornell	126	114	56	5	6	4	1	2	4	—	—	—
Duke	—	8	14	—	—	1	—	—	—	—	—	—
Georgia	60	65	69	4	3	1	—	—	—	—	—	—
Harvard	—	—	—	5	3	3	1	3	1	—	—	—
Idaho	113	104	111	8	6	4	—	—	—	—	—	—
Iowa	132	116	109	5	5	1	—	—	—	—	—	—
Louisiana	32	41	34	—	—	—	—	—	—	—	—	—
Maine	117	100	90	—	—	—	—	—	—	—	—	—
Michigan State	87	81	80	1	—	—	—	—	—	—	—	—
Michigan University	43	41	43	14	18	4	10	10	7	—	—	—
Minnesota	235	201	128	8	9	2	2	2	2	—	—	—
Montana	136	106	99	5	9	1	—	—	—	—	—	—
New Hampshire	39	35	43	1	—	—	—	—	—	—	—	—
N. Y. State College of Forestry	375	377	409	25	27	18	2	2	2	—	—	—
North Carolina	94	84	98	1	—	—	—	—	—	—	—	—
Oregon	199	151	97	2	4	3	—	—	—	—	—	—
Pennsylvania State	143	140	178	2	2	—	—	—	—	—	—	—
Purdue	67	58	69	—	—	—	—	—	—	—	—	—
Utah	81	85	79	—	—	—	—	—	—	—	—	—
Washington State	64	47	41	—	—	—	—	—	—	—	—	—
Washington University	147	120	111	17	12	5	—	—	—	—	—	—
Yale	2	1	—	41	37	26	10	13	13	—	—	—
Totals	2573	2388	2246	173	174	80	26	32	37	—	—	—

¹ Graduate students at California unclassified with respect to candidacy for Master's or Doctor's degrees.

for either the master's degree or the doctorate. The fact that 26 men were reported for 1931-32, and 32 men for 1932-33 as candidates for the doctorate is significant. Each of these two numbers would be increased if it were possible to classify the above mentioned figures reported by California and determine the actual number working for the doctorate at that institution.

In 1933-34 there was a great decrease in the number of men studying for the master's degree. Only 80 were reported. The reason is obvious. Men who would otherwise be engaged in graduate study are employed in the Civilian Conservation Corps or in other current conservation movements, and are deferring their graduate work to some later date. All schools which normally emphasize graduate training pointed out this fact when furnishing the statistics for this study. In contrast 37 men are reported working for the doctorate. This is to be expected. Most of the men in this class are recipients of scholarship aid or instructorships and are usually more concerned in attaining the definite educational objective of the Doctor of Philosophy than in employment which would defer the completion of their work.

In Table 3 are presented the enrollment statistics at the various forest schools in the United States for each of the last three years.

In examining this table, attention should be called to the fact that California draws to a considerable extent on Junior college students and therefore lists a disproportionately small number of freshmen and sophomores. Michigan lists no freshmen or sophomores. Cornell has no freshman class in 1933-34. And Colorado college (Colorado School of Forestry) being in its last year has in 1933-34 no freshmen, sophomores or juniors.

Mention may be made of Duke listing 8 pre-forestry freshmen in 1932-33 and 14 in 1933-34.

In Table 4 are presented the enrollments by years from 1903-04 to 1933-34 at all forest schools in the United States.

No particular interest is served by presenting a tabular statement showing the undergraduate enrollments by class for an extended period of years. It is, however, useful to have these trends for the last few years and one more table, Number 5, is presented with these data. Table 5 includes for each of the last 5 years the undergraduate enrollment by classes.

While the period is too brief for the accurate prediction of trends, the data in themselves are of considerable interest. The figures in Table 5 exclude special students and the totals, therefore, are lower than those found in Tables 4 and 5. For the year 1930-31, data were not available from Connecticut or Washington State College. The numbers would be very small and would not raise the totals appreciably. For the last three years of this table, the data include a small number of men registered as pre-forestry stu-

TABLE 4
UNDERGRADUATE ENROLLMENT AT FOREST SCHOOLS
IN THE UNITED STATES 1903-04 TO 1933-34

Year	Enrollment	Year	Enrollment
1903-04	19	1919-20	927
1904-05	39	1920-21	1,092
1905-06	51	1921-22	1,363
1906-07	98	1922-23	1,347
1907-08	143	1923-24	1,439
1908-09	258	1924-25	1,624
1909-10	357	1925-26	1,771
1910-11	518	1926-27	1,880
1911-12	591	1927-28	1,957
1912-13	637	1928-29	2,079
1913-14	868	1929-30	2,123
1914-15	904	1930-31	2,120
1915-16	944	1931-32	2,573
1916-17	897	1932-33	2,388
1917-18	560	1933-34	2,246
1918-19	498		

dents at Yale and Duke, both of which schools are on a graduate basis. The high enrollments for the year 1931-32 may be pointed out. For the last two years the numbers are also well sustained.

The 775 in the freshman class for 1933-34 include no figures from Cornell, though this school is represented in the enrollments for the upper three classes.

For the purposes of record a small number of facts may be presented inasmuch as they are of importance in the history of education in forestry.

Conforming to the action of the Board of Trustees of Colorado College in June, 1931, the Colorado School of Forestry will be discontinued at the end of the present academic year, 1933-34. In taking this action, the Trustees provided that all students in attendance in 1930-31 would be given the opportunity to complete their four years of study.

The College of Forestry at the University of Washington in 1932 was reorganized as a Department of Forestry in a College of Technology at that University. Within the next year it was, however, restored to its present status as a College of Forestry.

In September 1932, Duke admitted a number of freshmen as pre-forestry students looking toward a professional train-

ing at that institution. There were 8 men listed as pre-forestry in 1932-33 and 14 in 1933-34. Duke conferred upon three men in 1933 the degree of Master of Arts for work in forestry.

On Feb. 11, 1933, the decision was made by the Trustees of Cornell University to discontinue the undergraduate curriculum in professional forestry. In order to allow all students enrolled in 1932-33 the opportunity to complete their course of studies, the professional undergraduate course will terminate in June 1936. The last entering class was that of September 1932. The Department of Forestry at Cornell will gradually change over to an organization which will confine its efforts primarily to research, and the instruction of graduate students. Instruction in forestry as it relates to agriculture and extension work in forestry will be continued as heretofore.

One additional item of historical interest has recently come to the writer's attention. In Forest Education the statement was made that "perhaps the first course in forestry, in the larger sense, given at an American institution was a series of lectures at the Massachusetts Agriculture College by Dr. B. E. Fernow in 1887. A similar course was given by Dr. Fernow to the students of political economy at the University of Wisconsin in 1897."²

TABLE 5

UNDERGRADUATE ENROLLMENT BY CLASSES AND RATIOS OF SENIORS TO FRESHMEN IN FOREST SCHOOLS
IN THE UNITED STATES FOR THE YEARS 1929-30 TO 1933-34

Academic year	Freshmen	Sophomores	Juniors	Seniors	Total ¹	Ratios in per cent seniors to freshmen	Number of schools represented
1929-30	695	573	451	352	2,071	57	23
1930-31	620	565	434	377	1,998	60	22
1931-32	964	598	530	444	2,536	46	24
1932-33	811	619	497	448	2,375	55	25
1933-34 ²	775	628	467	368	2,235	—	24

¹Special students excluded.

²First term enrollments.

²Forest Education, p. 12.

S. T. Dana, Dean of the School of Forestry and Conservation at the University of Michigan, has discovered that instruction in forestry was offered at the University of Michigan as early as 1881.

The two courses in 1881-82 and 1882-83 and subsequent years were taught by Prof. Spalding in the Department of Botany, but one of these was also listed and emphasized as a course included in the School of Political Science, which was organized in the fall of 1881. The following description of the two courses offered is taken from the University of Michigan Announcements for the years 1881-82 and 1882-83 respectively:

UNIVERSITY OF MICHIGAN ANNOUNCEMENT

FOR 1881-82

FORESTRY

(Second semester)

1. Lectures on the following topics: 1. Historical: early laws and customs; schools of forestry and forest service of Europe; position of the science in the United States. 2. Influence of Forests upon Human Affairs: the forest as a physical feature of the earth's surface; climatic and sanitary effects; products. 3. The Forest Subject to Human Control: original distribution of forests and changes effected within historical times; preservation and renewal of forests; species for planting; methods of sylviculture; regions to be reforested; destructive agents

and their control; due proportion of woodland; recent experiments and their results. 4. Forest Legislation: European forest law; existing laws of the United States; necessity of suitable legislation. Friday, 2-3. Professor Spalding.

1882-83

(Listed under the economic sciences)

8. The Science of Forestry. Historical Development of the Science; Influence of Forests on Human Affairs; Control of Forests; Forest Legislation in Europe and in the United States. Second Semester. Twice a week. Professor Spalding.

It is highly probable that these two courses represent the first ones given at any of the colleges or universities in the United States. It would be interesting indeed to have the opportunity of studying the notes used in these courses.

At the present time there is no central agency for the collection of forest school statistics and other important material dealing with the progress and development of our forest schools. Certainly there is much which should be recorded. Should there be the desire on the part of forest school heads, faculties and others to continue this presentation and expand it to include the more important events in the field of education in forestry, the writer of this article will be glad to undertake the continued collection of such material with the aim of making an annual presentation in the JOURNAL OF FORESTRY.

BRIEFER ARTICLES AND NOTES

STANDARD TURPENTINE PRACTICE¹

TREE SELECTION

Use a 9" minimum diameter limit. (There may be a latitude of 1"—1½", depending on growth rate of trees. Good 8" slash runs 40 barrels, poor 9½" longleaf runs only 35 barrels.)

Eliminate poor trees such as spike topped, badly leaning, and suppressed trees with under 25 per cent cr. length.

Select side under the best developed part of crown.

Avoid placing faces over scars.

HANGING CUPS

Use rustless or rustfree cups and aprons.

Scribe face width at 1/3 breast high circumference or 12" maximum.

Expose little or no wood below tins.

Set cups level.

Restrict incisions for tins to less than the depth of the streak.

Install cups as low as is practical.

Hogals are helpful in preventing heavy slabbing for seating cups.

Gutter chisels or broadaxes and mauls maintain control over the depth of incisions better than free hand broadaxe strokes.

WORKING TREES

Height of face shall be 14" to 16" each season.

Depth of streak shall be $5/8$ inch for slash of $3/4$ " for longleaf. This may be modified for rapidly growing slash.

¹ Adopted by the Southeastern Section, Society of American Foresters, meeting November 11, 1933.

The peak angle shall be 130° for the first 3 years not sharper than 90° thereafter.

In the absence of definite knowledge a square streak is recommended.

Cut streaks weekly (except)

Double streaking is permissible in June and July (and August).

Maintain shoulders at the same level.

Keep chipping tools sharp and well cut out.

Use a chip paddle which covers tins and cup.

Cut an advance streak not later than Feb. 1.

Keep shoulder lines straight.

BACK FACES

U. S. F. S. places a second face when a 4" and an 8" bar can be maintained.

A third face may be cut if 4" bars are maintained.

The rest period depends upon growth rate, number of faces planned and ultimate size of tree desired when the last face is completed. Ordinarily this will be 4 to 10 years if 3 faces are desired and a 16" tree is wanted after it is worked out for turpentine.

Two faces shall not be worked concurrently.

RAISING

Raise preferably yearly depending on economic conditions.

Tack in streaks (or)

Restrict incisions to $1/4$ " radial depth (or)

Drive tins in jump peaks.

SUPERVISION

Close supervision plus a bonus for superior work is essential.

Inspect periodically and rate the work of woods riders for comparison.

Keep records of production and costs per crop.

SCRAPING

Avoid slabbing wood from faces.

Punch scrape at each dipping is probably good practice.

Use winged scrape box for low faces and push up bucket for high faces.

DIPPING

Dip at least every 4 streaks.

Where possible dip on 2 streaks.

A wood dip paddle is recommended for zinc, aluminum, and painted cups.

SPECIFICATIONS FOR AN EFFICIENT FIRE STILL

Construct the still masonry in accordance with the approved Government style of setting—wing wall, outside chimney, 16" to 17" still walls, asbestos sheeting and mortar, fire brick, iron rails over kettle, etc.

The copper kettle should preferably have fixed cap and removable lid.

The condensing worm should be a 35-barrel size.

The cooling tub should be of cypress, 10' in diameter, 12' high.

The water for cooling should be from a deep well or free flowing and as cool as possible.

Specifications for low insurance rate (or details for greatest fire protection).

1. Government style setting as above.

2. A standard make thermometer properly installed, in good condition, and used regularly.

3. Fireproof roof on still shed and over gum platform.

4. Metal guard over fire door joining wing wall with outside chimney flue.

5. Tub of sand and barrels of water on deck and near tailgate.

6. Double floor or deck with water-proof paper or tin in between and a 4" wood dam on deck.

7. "No Smoking" signs in prominent places and the rule strictly observed.

8. Turpentine and rosin stored over 100' from the still shed.

9. Separator barrel and spirit tub covered.

10. Batting dross, rock dross, and chips 50' or more from the still. Two barrels may be kept closer but not nearer than 25' from the still.

11. Fire drawn and thoroughly wetted before discharge, and all skimmings, etc., wet down with water.

12. All buildings more than 75' from the still.

DISTILLATION

Twelve gallons of water or more should be used to cool down the still.

A proper charge consists of 10 barrels of virgin, yearling or raised cup gum; 9 barrels of gum from faces unraised one year; 8 barrels old high pulling gum; or 10 to 12 300-pound barrels of scrape.

For proper temperature control, for making high grade rosin and for making less batting dross a thermometer is essential.

For a small operation a 10-ounce graduated glass will provide a fairly accurate check on the distillation.

For proper thermometer or graduated glass control the "Turpentine Stilling Chart" should be used as a guide.

A mixture of dried heart and sap or all dried sap (not rotted) wood makes the best fuel.

Turn out charge with some foam on the rosin.

SEPARATION OF TURPENTINE AND LOW WINE

A separator barrel should be fitted with automatic drain pipe (1½" brass) for

low wine draining from near the bottom of the barrel and emptying out 1" below the spirit pipe level.

A dehydrator filled with salt through which the turpentine must flow should be used. Coarse rock salt or ice cream salt should be used.

Both separator barrel and dehydrator should be covered to prevent evaporation of turpentine.

ROSIN HANDLING

For straining rosin use either

1. 4-mesh
- 14-mesh
- 4-mesh, with 1½ to 2 cottons.
2. 4-mesh
- 40-mesh
- 4-mesh, one cotton.
3. 4-mesh
- 8-mesh
- 40-mesh
- 4-mesh, one cotton.

Top strainer, 12' x 10"—11" deep x 33" wide.

Middle strainer, 14' x 10"—11" deep x 33" wide.

Bottom strainer, 16' x 10"—11" deep x 33" wide.

The tops of the strainers are flared.

Vat should be constructed of tongue and groove D4S nailed to a 2" x 4" frame with an air space of 4" between outer and inner sides.

Pour or dip rosin to cause the least amount of stirring possible.

Allow rosin to set as undisturbed as possible for 2 to 3 days.

ROSIN BARREL MAKING

A barrel drawn up with a ratchet or winch should be made tight without the use of clay.

GLUING AND CARE OF SPIRIT BARRELS

Glue should be melted in a double pot. Borax should be added to eliminate mould in glue.

Glue should be of the proper consistency before applied.

After settling overnight water should be thiefed out of barrel.

NIGHT CHARGING

Fire underwriters prohibit night charging.

SKIMMING

Dip should not need to be skimmed.

Scrape can be skimmed when ready for water.

CLEANING DIP BARRELS

Steam should be used or

A rounded shovel cut off at the point makes an excellent dipper if steam is not available.

FIRE CONTROL IN THE WOODS

Control or protection against burning should be practiced where feasible as higher rosin grades, better timber growth and more trees per acre result.



AN EFFECTIVE GATE FOR FOREST ROADS

A simple, cheap, and yet very efficient gate for woods roads has been developed for use on roads in the Duke Forest on which vehicular traffic is to be controlled.

The gate is constructed by setting two posts eight to ten feet apart, one on either side of the road. An ordinary three-eighths inch log chain is suspended between them at a height of about three and one-half feet above the ground. Care must be taken to set the posts far enough apart to permit passage of the widest vehicle or load anticipated. An eyebolt is fastened to one end of the chain and is bolted through one post. A hook, flattened at the point and with a hole through the flattened area, is attached to the other end of the chain and hooks into a second eyebolt which is inserted

through the other post. When the chain is hooked up the flattened point of the hook extends below the eye of the eyebolt through which it passes and a padlock can be snapped through the hole in the end of the hook, thus locking the gate.

Like most other administrative details, there are several features worthy of mention in connection with the construction of these gates. The posts should be made of some durable species, such as black locust, chestnut, or red or white cedar, and should be six to eight inches in diameter to insure sturdiness. They should be set at least three feet into the ground and should be anchored by tamping small rocks into the hole around the post in mixture with the soil. If posts can be selected with a knob or swell on the end to be placed in the ground they will be very difficult to loosen or pull up after being set. The tops of the posts should be bevelled to shed rain water.

The eyebolts and hook are made of ordinary half-inch round iron and can be rapidly fashioned by any blacksmith or forge worker. One eyebolt and the hook must be attached to the chain in the shop. The eyebolts should be made long enough to permit bending over or clinching after the washer and nut are in place. This will prevent the nut being taken off and the chain removed. A simple mashing of the threads on the end of the bolt is not sufficient as the nut can be forced off of these soft iron bolts with a big wrench. Flat iron washers should be put on both sides of the wooden posts. The chain should be long enough to allow a sag or not more than six to eight inches. This will prevent raising the chain to allow low vehicles to pass under.

To prevent rusting, the chains and bolts should be painted. Aluminum paint has been very satisfactory as it furnishes

a desirable contrast to the surroundings and makes the chain easily discernible. It has the added advantage of presenting an attractive appearance. Where aluminum paint is to be used, two base coats of red lead or outside metal gray must be applied to the iron chain or the aluminum will not stick. In addition, the base coats increase the length of time before repainting is necessary. Application of a coat of aluminum paint to the bevelled tops of the posts will add to the attractiveness of the set-up and assist in preserving the posts.

In the Duke Forest some 19 gates of this type have been erected at an average cost of \$2.63 for materials, ranging from \$2.18 to \$4.11. The cost varies, of course, with the width of the gate, the latter example being 22 feet wide. The prices quoted are based upon 14 cents per foot for the log chain and an average of \$1.01 per set for the material and the labor of making the hook and eyebolts and painting the chains. The red lead and aluminum paint averaged about 60 cents per chain. The cost of setting the posts and fastening up the chain is relatively low. All the padlocks used are keyed in a master series so that one key will open any of the locks.

Gates of this type are low in cost, simple to construct, and very effective in barring vehicular traffic. In regions where the general public has some appreciation of law and order and of the rights of private individuals they should prove highly satisfactory. In case traffic begins to cut through the woods to get around the gate, it is a simple matter to check this by setting a few posts on either side of the gate and stringing two or three strands of barb wire between them and the gate posts.

WILLIAM MAUGHAN,
Ass't Director, Duke Forest.

TRACTOR LOGGING VERSUS HORSE LOGGING IN SOUTHERN ARKANSAS¹

A comparison of the output of an Allis-Chalmers "35" tractor and that of teams was made in a selectively cut stand of southern yellow pine in Arkansas and the results are shown in Table 1.

TABLE 1

VOLUME LOGGED TO SPUR IN BOARD FEET, LOG SCALE		
	Tractor	Per team
1st day	39,068	13,000
2nd day	33,000	11,000
3rd day	37,000	10,000
Average	36,356	11,333

The hauls were short, none exceeding 450 feet. The teams used bummers, whereas the tractor ground skidded all logs. This test indicates that the tractor did work equivalent to at least three teams.

TABLE 2

DAILY COST OF TRACTOR

Gas at \$0.15 per gal.	\$3.00
Oil, 5 gals. for 60 hours	1.00
Grease and transmission oil	1.00
Depreciation 33 1/3 per cent	2.50
Interest at 6 per cent	.50
Upkeep or repairs	1.00
	\$9.00
Operating cost per day of the Allis-Chalmers "35"	\$ 9.00
Model "35" costs	9.00
1 driver	3.50
1 choker setter	3.00
1 landing man	3.00
Total daily cost of tractor operation	\$18.50

The cost of a team, including driver, swamper, and all other costs, such as feed, depreciation barns, etc., was estimated at \$11.00 per day. Assuming that three teams are required to do the work of one tractor there appears to be a margin of \$14.50 per day in favor of the tractor for logging.

A combination of team and tractor logging is adaptable to almost any con-

dition and makes it possible to save money by reducing the number of spurs per mile of main line. Under such a plan the horses take the short hauls and the tractor the long hauls.

R. D. GARVER.



FORESTRY NOTES FROM THE CAMBRIDGE MEETING OF A.A.A.S.

December 28-30, 1933

A total of 55 papers directly concerning forestry were read, covering chiefly; forest botany, dendrology, forest pathology and entomology, tree physiology, wood preservation, forest soils, wood technology and forest ecology.

Forestry subjects were discussed by Ecological Society of America, Botanical Society of America, American Phytopathological Society, American Society of Plant Physiologists, American Association of Economic Entomologists and in joint sessions of one or more society.

A special session of the American Phytopathological Society was devoted to pathological activities in ECW and recovery programs. Blister rust control was discussed by E. G. Filler and papers read on the Iowa forest disease survey and others on native and introduced forest diseases. The efficiency of wood preservation also received attention. Numerous other papers on forest pathology were read at other sessions.

Recently introduced parasites of important forest insects were described before the Entomological Society of America and the relation of the elm bark borer to the Dutch elm disease was covered in papers by R. K. Beattie and N. P. Felt. The beech scale, willow snout beetle, fir bark louse and birch leaf-mining sawfly were the subject of papers

¹By Hugh H. Honnen (Briefed).

by H. B. Peirson of Maine and others. Several papers dealt with the European pine shoot moth and gypsy and browntail moths. In the exhibit room one booth was devoted to the latter insects and their control.

Several papers of forestry interest were read before the American Society of Horticultural Science, such as one on fertilizing pin oaks and several on the propagation of evergreens and seed germination.

Tree physiology was the subject of many papers. M. Y. Pillow of the Forest Products Laboratory spoke on the effect of inclination of trees on compression wood formation, conduction by birch roots in frozen soil, germination of oak, basswood and other trees seeds, were subjects of other papers. Several dealt with mycorrhizal fungi on tree roots and A. B. Hatch and K. D. Doak demonstrated their experiments in laboratory and greenhouse. Nitrogen requirements of tree seedlings were shown by P. R. Cast of Harvard Forest with a comprehensive greenhouse experiment open to inspection. Many of the other exhibits were of great interest to foresters.

HENRY I. BALDWIN,
N. H. Forestry Department.



NOTES ON FORESTRY IN PHILIPPINE ISLANDS

The Manila Daily Bulletin, issue of October 31, 1933, reviews the year's work of the local lumber industry. The Philippine Forest Service and the local lumber industry coöperate in furnishing pertinent data. Lumber is one of the leading industries.

The Philippine Forest Service was organized in April, 1900, by Colonel George P. Ahern who became its first director.

At that time the forest area amounted to about 40 million acres, 98 to 99 per cent of which was publicly owned. In 1902 a Congressional Act, suggested by Gifford Pinchot and Colonel Ahern, provided that no public land in the islands could be sold, leased or homesteaded without the certificate of the Bureau of Forestry that it was more valuable for agriculture than for forest purposes.

Today after thirty years of exploitation the forest area is undiminished in extent and value, and in addition some 12 million dollars have been received in revenue on forest products, 51 per cent of which has been net profit to the Insular treasury. From 1900 to 1922 the annual revenue was \$300,000, while during the following 10 years the revenue has been \$500,000 annually. The above mentioned newspaper article goes on to state "it is the only Bureau in which government and business find themselves in good fellowship." There are 107 sawmills in the Islands, well equipped with modern machinery and with a daily capacity of 60,000 to 125,000 feet. The present stand of timber is estimated at 486 billion board feet. The annual cut, 200 to 250 million, is 5 to 8½ per cent of the annual growth, quite different from the record in the United States where the cut of merchantable timber amounts to six times the annual growth. Nearly one-half of the annual cut, about 100 million feet, is exported to some 18 foreign countries, including Japan, the United States, China, the United Kingdom, South Africa and Australia. This is the largest export of tropical woods from any country in the world. The ratio of the forest area to the land area is 72 per cent, while in Sweden, which has the second highest ratio, it is 55 per cent. There are 3,000 tree species in the Islands, of which 200 are observed in the market.

During the Spanish régime natives were not permitted to have technical positions or training in the Forest Service. Today out of a trained personnel of more than 500 in the Forest Service, but one, Director Fischer, is an American; the rest are well trained Filipinos, proud of the Service and of the Forest School that since 1912 has been turning out twenty or more graduates each year. Each forest officer supervises 200 square miles of forest land and each is keenly alive to the fact, and sees to it, that this great natural resource is developed in the public interest.

In the early days, Colonel Ahern states, it was no easy matter, with inadequate personnel, to cruise, study and develop 40 million acres of unknown forest scattered over 7,000 islands. The United States lumber interests had learned something of the great forest wealth of the Islands and a number of investors came out to investigate the possibilities of developing it. For ten years before the Spanish War there had been a lively debate between local forest conservationists and the United States lumber industry. With this in mind Colonel Ahern welcomed these investigators and told them he had mapped and cruised several of the most promising and accessible forest areas, of which rough working plans were made available for the use of investors. Each working plan was accompanied by a contract or license agreement giving exclusive privileges for 20 years over the forest area desired and renewable at the end of that period. Each area conformed in size to the proposed investment and size of plant. The concessions were granted free of charge, the principal concern of the Forest Service being careful woods operations, especially the requirement that no trees under sixteen inches in diameter be cut. A rea-

sonable bond to guarantee performance was demanded, and the operations were supervised by local forest officers. In drafting license agreements, two thoughts dominated: first, that the woods operations must leave the forest in productive condition; second, that the investor be aided in making his enterprise profitable. As a rule, these 20 years license agreements have been renewed for a like period due to financial success of the operations. The first contract or license agreement was signed in 1904 and renewed later. Some ten to twenty other agreements are now in operation. A number have been renewed at the termination of the period of the agreement. Some 2,000 other timber licenses are granted for operations on small tracts, for one to five years.

Of the million or more acres of privately owned forest land, about half a million acres comprising 821 separate parcels have been registered with the Bureau since 1900. These operations also are supervised by forest officers. Some of these privately owned forest tracts contain very heavy and valuable stands of timber but have not been exploited due to the fact that suitable working plans have not been furnished.

One thousand and seven hundred communal forests have been set aside for the free use of forest products by people of the locality. If signs of overcutting are noted on these communal forests, operations are stopped.

Filipinos proved to be skilful in handling modern logging and mill equipment. Borneo has found the Filipino graduates of the Forest School very helpful in the woods and has maintained for some years a number of scholarships at the Forest School. South China is now preparing to do the same.

The Philippine forest policy with its

comprehensive license agreement, protected by a bond, explains why the Forest Service has maintained an effective control of woods operations and also explains why the Insular forests are conserved and why they are more valuable today than in 1900 when the Americans took charge.

GEORGE P. AHERN.



HEREDITY TESTS OF DOUGLAS FIR SEED AND THEIR APPLICATION TO FOREST MANAGEMENT

To get the best possible results, what type of seed tree should be left to re-stock cut-over areas; and from what types of trees should seed be collected for planting stock?

Heredity tests begun in 1912 at the Wind River branch station indicate answers to these questions. In these tests, seed was collected from both old and young trees, healthy and conky trees, in dense and open stands, on good soils and poor gravelly soils, from low as well as high altitude. Obviously not all forms of parent trees could be found in one locality, and a total of 13 different localities had to be sampled in Oregon and Washington to cover all conditions. The planting stock was produced in the Wind River Nursery and outplanted in 5 plantations on 4 national forests in western Oregon and western Washington. These 19-year-old progeny of the first generation at the time of the last measurement (1931), averaged 27.3 feet in height for the best strain on the best planting site and 4.0 feet in height for the least vigorous strain on the poorest site.

The results indicate that when a forest is cut, leaving a residual stand to supply the new crop by natural reseeding, the character of the tree is not very important.

On the other hand, if a certain area is denuded and seed must be brought in from another source, the question immediately arises, what source to choose; whether seed from lower altitudes, or higher altitudes, from more southern or more northern latitudes is acceptable. So far as survival, but not growth, is concerned, no significant difference was found in stock from different sources. Low altitude stock survived in high altitudes as well as high altitude stock. Stock from Oregon planted in Washington, survived as well as the native stock. Stock from damp habitats survived well in dry habitats. The greatest mortality for any strain under the most adverse conditions (4600 feet elevation on shallow soil) was only 24 per cent.

Although no effect was found on survival, seed source had a significant effect upon rate of growth. When planted in the mild climate of the Coast Range, the stock from parents growing between 2800 and 3850 feet in the Cascades was 25 per cent below the average height of all other strains; but when planted in its native and more severe climate at 4600 feet elevation in the Cascade Range, it was 27 per cent above average height. Likewise, coast stock was 19 per cent above the average height of the 12 other strains when planted in its native habitat, but 18 per cent below the average when planted in the Cascade Range. Certain local strains, however, are apparently adapted to extreme differences in altitude or climate, while others are not.

W. G. MORRIS,
Pac. N. W. For. Exp. Sta.

THE INTENSITY OF TIMBER CRUISES AND
ITS RELATION TO ACCURACY

Timber estimators are fond of arguing the relative accuracy of various intensities of cruising. Four runs through a forty are often considered to give an accurate estimate, especially if compared to a two-run and one-run cruise. Actually the real issue is connected with the size of area for which an accurate estimate is desired and with the variability of the stand on this area. Were the stand absolutely homogeneous, it is evident that a single plot would give an accurate estimate. As soon as variability increases as a factor, more and more plots or strips must be taken to get a satisfactory answer. Depending upon stand conditions and demands for accuracy, a cruise may error by being too intensive, i. e., too expensive, as well as being too extensive, i. e., too unreliable.

In order to make comparisons, the strip tallies on a four-run job were recorded separately by strips and forties in 800 acres of the ponderosa pine type on the Pringle Falls Experimental Forest. A study of the various combinations of strips and of the variation in the stand permits one to draw a few conclusions which are applicable to this type. Casual inspection would classify this forest as a continuous stand, but examination of the strip tallies shows that the poorest forty based upon the four-run cruise ran 7 thousand board feet to the acre, while the best forty ran 23 thousand feet. If a one-run estimate were used, then the poorest forty would have been 2 thousand feet and the best 30 thousand feet. Apparently the stand is far from being homogeneous and the placement of the strips will have a great effect upon the final result.

First of all the variation within a forty

should be considered. The poorest set of strips showed acre values of 11, 8, 0 and 17 thousand feet, a variation represented by a standard deviation of approximately 6.2 thousand feet, while the most constant forty had values of 16, 15, 13, 12 thousand feet per acre, or a standard deviation of 1.3 thousand feet. The average variation of a forty, based upon 20 forties, is expressed by the standard deviation 3.6 thousand feet. The significance of this measure can be illustrated as follows: if an average forty in this forest type is cruised by a one-run cruise, then the true average stand per acre in 68 out of a hundred forties cruised will be within 3.6 thousand feet per acre of the estimated value, or in 95 stands out of a hundred within 2×3.6 or 7.2 thousand feet of the estimated value. Quadrupling the number of strips should halve this error, if the placement of the timber were not a factor. The average stand being 15.6 thousand feet per acre, a four-run cruise may still have back of it,

3.6

therefore, a standard error of

2×15.6

or 11.5 per cent. Actually the error for a four-run cruise is not as low as theoretically indicated, since the groupiness of the timber has a moderating effect and tends to draw together the errors of the one, two and four-run cruise. Obviously absolute accuracy, or even a moderate degree of relative accuracy, in every forty estimate is unattainable without greater intensity than a four-run cruise.

A second consideration is the accuracy of the estimate of units larger than a forty. One way to approach the problem is empirically to determine the errors of one, two, and four-run cruises over 80 acres, quarter sections, half sections, sections and so on. Another way is to determine the size of area which must be

covered to get within a standard error of 1 thousand board feet per acre, for instance, in the estimate for the entire area. Each of these approaches dismisses the location of the timber within the unit, but considers simply the accuracy of the final estimate. The computations for the tract in question show that to get within a standard error of 1 thousand feet per acre, about $2\frac{1}{2}$ sections must be covered by a one-run cruise. If the number of strips is doubled, then only $1\frac{3}{4}$ sections must be covered to get within the standard error of 1 thousand board feet. If the number is again doubled, to four runs through a forty, then between one and one and a half sections must be covered. The two-run cruise is apparently somewhat more superior to the one-run cruise in actual practice than the four-run is over the two-run.

Another cruising test made along similar lines in the ponderosa pine type near Klamath Falls revealed similar relationships, namely, that the estimate of a single forty by even a four-run cruise is far from accurate and that even a moderate degree of accuracy, such as a standard error of 1 thousand board feet per acre, can not be attained unless areas of the size indicated above were covered. This second stand included a certain amount

of sugar pine and Douglas fir. With the units and number of strips mentioned, the sugar pine would be estimated to within $\frac{1}{4}$ thousand board feet per acre and the Douglas fir to within $\frac{1}{2}$ thousand board feet. For scattered species of great value, probably nothing short of a 100 per cent cruise is satisfactorily accurate.

C. W. KLINE,
W. H. MEYER,
Pac. N. W. Fort. Exp. Sta.



ROYAL SCOTTISH FORESTRY SOCIETY

The 81st annual business meeting of the Royal Scottish Forestry Society was held in Edinburgh on February 23. A paper entitled "The Use of Treated Timber" was presented and discussed. The 52nd annual excursion will be held in southern Perthshire, June 4-8.



ERRATUM

In the January, 1933, issue of the JOURNAL, the following correction should be noted: On page 102, column 1, line 32 should read, "approximate cost of \$3.12 per tree."

REVIEWS

Pokrok v lesni ochrane za posledni období (The Progress in Forest Protection). By Prof. Ing. Alois Nechleba, Bohemian, 101 pp., Prague, SPLI, 1932.

The book is an addition to the three-volume text on Forest Protection, published in 1923. It contains a summary of the new problems and recent discoveries in this field, partly of local and partly of general significance.

The actual tasks of forest entomology and forest pathology in Czechoslovakia to-day may be gleaned from the cited resolution of a special committee on the coöperative activity of forest practice and forest research, which is as follows: "Our forests at the present time are especially attacked by *Bombyx monacha*, *Bostrychus spp.*, *Sphaerella laricina*, *Lecaninae*, *Trametes radiciperda*, *Peziza Willkommii*, *Aecidium* and *Agaricus melleus*. Practical forestry expects the research institutions to join energetically in the struggle against the insects and the fungi mentioned. The research should be concerned first of all with preventative measures, associated with a sound silviculture, hoping to avoid the use of toxic chemicals. In this respect it is suggested to study the effect upon the forest of the different insecticides, particularly those containing arsenic. It is desirable also to develop more intensively the study of the American methods of the "biological control."

Among the other insects the damage of which recently became pronounced, the author cites *Ips cembrae*, *Enarmonia diniana* and *Dreyfusia piceae* (*D. Nüsslini*); the first two occurring mainly on spruce, and the last one on fir.

The facts regarding several factors sup-

pressing the normal development of forest stands and previously overlooked in practical management are summarized. The most important of these factors are: lowering of the ground water due to mining enterprises and water supply of the towns, injurious effect of gasses from chimneys and other waste products of the factories, detrimental influence of ground winds.

A new important phenomenon is considered among the subjects of forest protection, i.e. diseased forest soil as a result of cultivation of pure coniferous stands outside of their natural areas. This fact found an expression also in the resolution of the committee above mentioned in the following form: "Practical forestry necessitates from research institutions a study of the gradual denudation of soil and progressive development of hardpan layers." Summarizing the results of the investigations of this problem the author devotes special attention to the work of Dr. E. Wiedemann: "Zuwachs-rückgang und Wuchsstockungen der Fichte." Referring to this publication Prof. Nechleba makes a rather interesting statement: "Being myself a pupil of Gayer, I must confess that his lectures did not leave with me as favorable an impression and did not create as much confidence as the publication of Wiedemann. Gayer was teaching, warning and suggesting, whereas Wiedemann gives concrete examples of disastrous conditions, based upon the data of precise analyses. . ." There could be no better compliment for a Central European forester.

Not without interest to the American reader is the author's statement regarding forestry in U. S. A., particularly regarding the problem of acclimatization of

European spruce. He says: "I read sometime ago that the alpha and omega of American forestry is, besides fire protection, mainly 'forest alchemy,' i.e. transformation of the forest into dollars and cents. Those, however, who are following with no prejudice the work and energy of the American foresters can not help, but retain their recognition and admiration. . . As to forest protection in America, I have already written in my 'Lesni Pozary' (Forest Fire) and want to point out once more how seriously Americans take their forest problems. One of the problems to-day in U. S. is acclimatization of European spruce in order to secure a permanent supply of raw material for the local pulp industry. While we went blindly into so-called 'spruce mania' and replaced with no preliminary studies or consideration the natural stands by the spruce, the Americans are preparing for the same operation carefully and on a scientific basis. They study the conditions of spruce development in Europe and at the same time they study their own climate and soils with respect to this species. In this way America aims to avoid bitter disappointments which we have had to such an extent in Europe. It could, therefore, be predicted in advance, that if this careful way is followed, the first generation of spruce in United States will be much more successful, than it was on numerous localities of the Central European plains. For the future, however, it seems doubtful whether it will be possible to preserve the favorable conditions of soil, if the spruce is planted in pure stands and regenerated only artificially."

The great advantage of the book is its purely silvicultural approach to the problem of forest protection. The author deals with the actual forest and facts as they are now, and not with the problematic prescriptions of control of the future calamities.

S. A. WILDE,
University of Wisconsin.

Perfecting a Stand-Density Index for Even-Aged Forests. By L. H. Reineke, *California Forest Experiment Station. Journal of Agricultural Research, Vol. 46, No. 7, pp. 627-638. Gov. Print. Office, Washington, D. C. April 1, 1933.*

Stand density is an important factor both in mensurational studies and in management. Foresters know how difficult it is to determine the density of a stand and any method which serves to simplify or more rigidly fix density, is quite welcome. In this article, Reineke presents a "stand-density index" which he has worked out using the sample plot measurements which were obtained for the normal yield studies of a number of our important timber species in the United States. It is somewhat less subject to personal error than the basal area method because it depends on a straight line relation which is capable of more accurate determination than the curved relation between basal area and age.

The method is based on the premise that average stand diameter alone describes relative stand distribution since the other characteristics describing distributions are highly correlated with average diameter. It is an established fact that even-aged stands have characteristic tree size distributions. Therefore, number of trees and average diameter of the stand definitely describe the stand and any difference in number of trees for a given average diameter is attributable to a difference in stand density.

The author shows that when number of trees in even-aged stands is plotted over average diameter on logarithmic cross-section paper the curve assumes a straight line form. The curve is represented by the equation

$$\log N = -1.605 \log D + K$$

in which N is the number of trees per acre, D is their average diameter (by basal area) and K is a constant varying with species. Of the 14 species investi-

gated Reineke states that 12 are satisfied by this equation. The other 2 vary slightly as to slope but appear linear in form.

Since the constant K varies with species a series of parallel lines on logarithmic graph paper, number of trees over average diameter, represents degrees of stocking for the various species. The number of trees at an average diameter of 10 inches or where these parallel lines cross the 10-inch ordinate is recommended as, and called, "stand-density index." A line parallel to the others and passing through the point representing 1,000 trees at 10 inches is called the "reference curve." It represents the maximum for all species studied. Maxima lines parallel to the reference curve were fit to the maximum plots (those having the greatest number of trees at any average diameter) of each species.

The stand-density index of any stand can be determined from such a chart of parallel lines each representing a certain index value. Comparison between stands or species can be made by direct comparison of their stand-density indices. Relative densities of stands of the same species can be expressed as percentages of one to the other. The percentage relation of any stand to the maximum for that species is the rigid expression of density of that stand.

To test the effect of age and site on this relation, correlations were made between density (percentage number of trees), age, and dominant height for three different species. These correlations were not significant, indicating that age and site are expressed in average diameter so need not be considered further.

There are two things which the reviewer thinks might well have been included in this article. First, the average regression equations and the errors of the regression coefficients for the 14 species investigated. These values would definitely show how well the curves for the indi-

vidual species conform to the reference curve for all species and would be of considerable value in future comparisons. Second, some explanation as to how the maximum line for a species was determined. Was it placed at an arbitrary number of standard units above the mean of the normal yield plot values or graphically located by eye? The reader has a right to know these things so as to properly evaluate the results.

There can be no more arguments as to the density of a stand, then, if this relation is accepted. Once the maximum line has been determined for a species, the average diameter and number of trees of any stand rigidly determines the density.

This idea is an important contribution to forest mensuration. No matter how carefully yield plots are selected as to full stocking considerable variation in density occurs. On the basis of this straight line relation, plots exceeding 2½ or 3 standard units from the average can be searched for errors and eliminated as belonging to another universe if too many occur. Also, density can now be used with some success as a variable in the determination of yield and will probably help solve the problem of application of normal yield tables to understocked stands.

G. LUTHER SCHNUR,
Allegheny Forest Experiment Station.



**Trees of the Yazoo-Mississippi Delta
and Their Economic Values.**
Ext. Bulletin No. 67, November,
1933, adapted by D. E. Lauderburn.

This extension bulletin has been adapted by Lauderburn from the mimeographed unpublished manual prepared by Putnam and Bull of the Southern Forest Experiment Station, entitled "Trees of the Bottomlands of the Mississippi River Delta Region." The present form of presentation

makes the information of more interest to forest land owners than the more technical and lengthy original.

Advance tables from the forest survey of the Delta Hardwood Region of Mississippi give data on land types, forest condition and the acreage in each type. Additional tables showing total stands by species would have added much, but were not ready to be released by the Forest Service.

The bulletin discusses each important bottomland species from the standpoint of distribution and habitat, its economic importance, chief distinguishing characteristics, and its major uses. Putnam's contribution to our knowledge of the various uses and economic value has been of real value to foresters, and this adaptation by Lauderburn should be of equal value to woodland owners.

G. H. LENTZ,
Planting Chief T.V.A.



The European Pine Shoot Moth
(*Rhyacionia buoliana* Schiff).
With special reference to its occurrence in the Eli Whitney Forest. By Roger B. Friend, Yale University. Yale University School of Forestry Bulletin No. 37.

The European pine shoot moth is one of the many injurious insects that have reached our shores from other lands, and promises to be a dangerous pest in forest plantations in America. The insect is especially injurious to Scotch and red pine. It is not a tree killer but, by mining buds and new growth and by feeding upon the surface of the expanding shoots, it cuts down the growth rate of the trees, causes twig deformities, and if very abundant causes the development of bushy misshapen trees of no commercial value. If this insect should spread throughout

the pine-producing regions of the United States it might easily become one of our most important forest pests.

Since it was introduced into the United States about 19 years ago it has spread to many scattered localities from Connecticut, where it was first established, to Michigan and New Jersey. Presumably it has been carried from place to place on infested nursery stock. Although it is present in southern Michigan it has not as yet been found in the coniferous forest areas of the Lake States. In New York and Connecticut, however, the insect is present in numerous forest plantations of red and Scotch pine.

In Bulletin 37 of Yale University School of Forestry Friend presents the most complete discussion of this insect thus far published in America. He not only presents the results of his own researches on the Eli Whitney Forest, but also summarizes European literature in a very effective way. The bulletin is, according to the author, a preliminary report designed to make available the information collected to date and presumably will be followed by other publications as further information is collected.

The first half of the bulletin is taken up largely by a very excellent summary of work already published, supplemented by original observations and including discussions of the systematic position of the insect and descriptions of the various stages, its geographic distribution and importance in Europe and America, its host preferences, and a detailed account of its life cycle and habits.

The latter half is concerned with the relation of the insect to red pine stands in the Eli Whitney Forest and suggestions for control. This portion of the bulletin is not very satisfying and the reader is left with a rather hopeless feeling. This is doubtless due to the preliminary nature of the report and later work will present a more complete and satisfactory picture.

No thoroughly satisfactory methods of control are suggested, but the slow rate at which the insect spreads in a plantation and from place to place encourages one to believe that ultimately the control of this insect will be possible.

The reviewer has been asked whether, in the light of Friend's report, the planting of red pine in Michigan and other states should be discontinued. The answer should, we think, be an emphatic negative. It may be logical to recommend the discontinuance of planting an exotic tree of inferior quality, such as Scotch pine, because it is particularly susceptible to insects or diseases, but with a native tree of high quality the situation is entirely different. We must learn to live with and protect our crops from noxious insects and diseases. Any other attitude is one of defeatism.

No species of tree can be mentioned which is not attacked by diseases or insects that at present we do not know how to control, and which are as potentially injurious as the European pine shoot moth. Therefore, we should recommend the elimination of a species only as a last resort. Otherwise, if we are logical, we shall be placed in the embarrassing position of recommending the elimination of all our important tree species from our forests.

It is conceivable, although improbable, that the red pine may be out of place on the Eli Whitney Forest in spite of its excellent growth there. If so, some other species should be substituted, but if a species is growing where it belongs it seems almost certain that satisfactory control of the pests of that species can be found.

Friend's bulletin represents an excellent start in the study of one of our important insect pests. We trust that he will be able to carry his investigations to a logical conclusion.

S. A. GRAHAM,
University of Michigan.

How to Propagate Forests in our Steppes and How to Take Care of Them. By G. M. Vysotsky. *Kharkov, 1930. 24 pages (Russian). Reprint from 14th Vol. of Forest Experimental Work in Ukraine.*

The early decadence of the windbreaks in the steppes of Russia has left the farmers discouraged and with little interest for the continuation of prairie plantings. The Russian forester, Vysotsky has made a critical survey of this situation. A brief summary of his findings, experiments, and recommendations are given in this paper.

THE REGION: ITS CLIMATE, FORESTS, AND SOILS

The observations from which Vysotsky draws his conclusions were made in both the northern and southern steppes.

Climatically, the two sections differ widely. In the northern steppes, the forces of precipitation and evaporation are somewhat in equilibrium, and natural forests occasionally are found. The southern steppes, where the ratio between precipitation and evaporation falls below 0.7, are much less favorable to tree growth.

Soils, too, differ considerably from north to south. Tshernosems are the dominant soils of the northern and central steppes. In the southern part of the region, the Tshernosems give place to the chestnut-colored soils of northern Crimea. Both Tshernosems and chestnut-colored soils are formed under climatic conditions which are dissimilar to those ordinarily found in forested regions. Deficiency of moisture and the alkalinity of the lower soil strata are the chief characteristics which distinguish these prairie soils from those of forested regions. Peculiarly, as one goes from the top to the toe of slope areas, the soils of the Steppes Region are often observed to be

come saltier and sandier. It was also observed that under given topographic and climatic conditions sandy soils are more favorable to tree growth than heavy loams, clay Tshernosems, and chestnut-colored soils.

EARLY WINDBREAKS

Most of the early plantings in the steppes were of the so-called "normal" type. Characteristically, these plantations were comprised of a mixture of elm, oak, maple, and ash. Several factors resulted in the early decadence of most of these "normal" windbreaks. When moisture conditions were favorable, the elms invariably grew faster than the oak, maple, or ash, suppressing or killing them. Those trees not killed outright were badly weakened, and as a consequence, insect losses were high. "Normal" plantings were even less suited to the southern steppes in the region of chestnut-colored soils. There, the dryness and the alkalinity of upper soil layers resulted in abnormal losses for the species of the elm family.

EFFECT OF WINDBREAKS UPON CROP YIELDS

Vysotsky is not convinced that forest strips increase crop yields, particularly in the southern steppes where snowfall is light. Under this latter situation, the forest strips use soil moisture to the detriment of crops. Admitting that his evidence to support this contention is not adequate, he ventures the opinion that the problem has not been properly approached. Particularly is the past experimental work open to question. Because of physical variations of habitat, great differences have been found to exist between experimental plots and their checks. The author suggests a method of scientifically studying these physical variations, resembling, in general, the R. A.

Fisher's technique of plot experimentation. The peculiarity of field experiments lies in the fact that the area of ground chosen for the experimental plots may be assumed to be markedly heterogeneous. Treatment must be replicated in order to insure the reliability of conclusions.

PLANTING EXPERIMENTS

Inasmuch as the old "normal" plantings had proven to be more or less a failure, Vysotsky began a series of experiments to determine what to plant in the steppes regions and how to plant it. It was observed that the best natural stands were predominantly oak (*Quercus pedunculata*), with a dense understory of woody shrubs. This observation served as the starting point for experiments involving mixtures of oak and other species.

Several methods of mixing oak with other trees and shrubs were tried. One of these methods consisted of planting oak in row-by-row mixtures having the following cross-sectional composition: F-S-O-S-F-S-O-S-F, where "F" designates fast-growing trees, "S" slow-growing trees or shrubs, and "O"—oak.

This method proved to have radical shortcomings. For example, much less oak was planted than either the fast-growing trees or slow-growing shrubs, and oak was the species most desired. Furthermore, no compensation for this fact could be made by closer spacing of the rows, which, of course, would have increased the number of oak per acre, because of the deficiency of soil moisture.

A second scheme was tried which appears to hold more promise. By this method oak can be planted as alternate trees in every other row:

S - O - S
F - S - F
S - O - S

Some caution is necessary in selecting

tree species for the "F" spaces and shrubs for the "S" spaces. If the "F" spaces are planted with such relatively slow-growing species as *Acer tataricum* and *Acer campestre*, linden, horse chestnut, *Celtis australis*, *Pyrus torminalis*, *Crataegus* sp., *Cornus mas*, *Thuja orientalis*, and *Juniperus communis*, little suppression of the oak will result and, eventually, it will predominate. On the other hand, if such fast-growing trees as *Ulmus campestris*, *Fraxinus excelsior* and *Robinia pseudocacia*, are planted in the "F" spaces, the oak will soon be suppressed and cleanings and thinnings will have to be made several times during the life of the stand. Inasmuch as the black locust thinnings are quite valuable for small posts and fence rails, the suppression of the oak, in this case, is somewhat compensated for.

Experimentation has proven that not all shrubs are suitable for planting the "S" spaces. Such species as *Elaeagnus angustifolia*, *Amorpha fruticos*, *Halimodendron argentea*, *Colutea arborescens*, *Hippophae rhamnoides*, *Lonicera tatarica*, *Prunus spinosa*, are not shade-enduring and, therefore, cannot be used for planting.

The shade-enduring shrubs are *Viburnum lantana*, *Cornus mas*, *Cornus sanguinea*, *Cornus alba*, *Lonicera xylosteum*, *Staphyllea pinnata*, *Prunus mahaleb*, *Crataegus melanocarpa*, *Sorbus torminalis*, and *Pyrus elaeagrifolia* are also very desirable, since they can withstand drought and are slow-growing shrubs. In Ukraine, and the northern Caucasus, *Buxus sempervirens* and *Maclura aurantiaca* are also very good for planting in the "S" spaces. When possible, shrubs producing fruits or berries suitable for either human consumption or as food for birds, should be planted.

Caragana arborescens, *Rhus cotinus*, and *Rhus cotinus coggygria* may also be

mentioned. These shrubs are recommended because of their climatic adaptability to the region. They are drought resistant.

RESULTS OF EXPERIMENTAL PLANTINGS

General.—Several interesting facts have come to light as a result of mixing oak with other trees and shrubs, using the second planting scheme outlined above. It has been found, for example, that in the fresh soils of ravines, heads of springs, etc., the shade-enduring shrubs may be entirely omitted. Under such ideal conditions of growth, ash and oak were successfully planted with such tolerant species as maple, basswood, hackberry, and cherry.

It was also observed that in general composite stands of several stories are best adapted to the steppes region. Such plantings shade the soil better, conserve moisture, and add to the humus of the soil. There is also evidence to show that the mixing of hardwoods and conifers is not impracticable in many parts of the steppes. However, there are some essential facts that must be recognized. It has been found, for example, that when fast-growing conifers, like Crimean pine (*Pinus taurica*), are planted with oak on loamy soils, the oak may be somewhat suppressed. In order to forestall this possibility, underplanting with tolerant hardwoods (*Tilia* and *Acer* are favorite genera) is often delayed for a period of two years in the region of degraded *Tshernosema* and forest loams in the northern steppes. Interestingly enough, there is some evidence to show that when *Larix* and *Fraxinus* are planted in mixture, the growth rate of ash is stimulated by the presence of larch. Larch and Crimean pine (*Pinus taurica*) are believed to be two of the best conifers for use in mixture with broad-leaved species.

Forest strips, comprised of hardwoods

and conifers in mixture, were found to be more efficient snow catches than pure hardwood strips.

Hardwood-coniferous mixture usually are more successful on sandy soils than on heavy, rich Tshernosem.

Growth.—One of the most interesting phases of the study of the forest plantations in the Russian plains region, is the one of growth. Conifers, especially, were observed to be wholly different in the rate at which they grew. Juniper and Thuya grew slowly, but were fairly long lived. The fast-growing but shorter-lived group includes some species of the genera *Larix*, *Picea*, *Abies*, and *Pinus*. This group do best in a fairly moist climate. The pine and spruce intolerant to shade. Some species (*Picea schrenkiana* and *Abies concolor*) require cultivation for the best growth.

Other than larch, the fast-growing conifers produce weak wood on Tshernosem soils. The explanation given for this phenomenon is that in the spring these soils are warm and wet, encouraging the trees to grow rapidly and put on a large ring of "spring wood." Later in the season, when the heavier-celled "summer wood" is normally put on, the soil dries out so much that growth almost stops. As a consequence, the normal balance between spring and summer wood is upset. It is thought that the spring wood-summer wood ratio will be improved by planting fast-growing conifers on poor sandy soils.

Management.—One of the important outgrowths of this experimental work was the development of better methods of forest management for the planted groves or windbreaks. Management should start, in these plantations, with the closing of the crown canopy. Ordinarily three stand elements will have to be considered: (1) the principal tree species (usually oak);

(2) the secondary tree species, and (3) soil-improving and moisture-conserving shrubs. Just enough pruning, thinning, and clear-cutting should be done to prevent crowding, and the depletion of soil moisture. Several Russian investigators have found that thinnings and clear cuttings improve soil moisture conditions in the groves of the steppes. S. F. Kramov found that plantations gradually diminish the water supply of the soil on plowed areas. G. F. Morosov and V. I. Akopov have shown that when a plantation is cut, moisture conditions become much better even in as short a time as one year. Akopov also found that the moisture supply is greater in understocked or heavily thinned stands than in fully stocked or unthinned stands. It was also noted that a little acceleration took place after thinning on heavy Tshernosem soils. Ordinarily, in regions of natural forests, this increase would be attributed to light, but on Tshernosem soils, in dry regions, the increment increase is probably due to improved moisture conditions.

Operations of a silvicultural nature should be carried out just prior to the so-called "crisis period" of the forest plantations. This period is ordinarily coincident with depleted soil moisture and drought conditions, and usually occurs when the stand is 20 to 30 years old, although it may come any time between the fifteenth and fortieth years.

Cultural Treatment for Plantations in the Southern Steppes.—In the southern steppes, fallowing has been found helpful in establishing plantations. Fallowing alone is not enough, however, thinnings and cleanings are necessary at short intervals until the crown canopy has closed. For this reason, groves are expensive to bring through. Shrubs, especially the genera *Prunus*, *Cornus*, and *Spiraea*, are usually more apt to estab-

lish themselves than tree species. Fast-growing hardwoods, like elm, requiring considerable soil moisture, are practically certain to fail. Cultivation during the early life of the plantation is helpful.

CONCLUSIONS BROUGHT OUT BY THE INVESTIGATIONS

There must be some adjustment made for climatic differences when choosing tree species for the groves of the Russian steppes. Trees that do well in the southern part of the region may not be frost-hardy in the northern part, and conversely, species indigenous or adapted to the cooler, more humid climate of the northern steppes will ordinarily be unsuited for the hot, droughty conditions of the southern steppes.

Vysotsky closes his paper by saying, that in his belief much more investigative work is necessary before the questions of what to plant and how to plant it in the steppes can be definitely settled.

Much ground has been lost in the afforestation of the tree-less plains of Russia due to the high losses in old plantations, and the ground not already lost is being held mostly because more is known about desirable species and cultural methods.

S. R. GEVORKIANTZ
and H. F. SCHOLZ,

Lake States Forest Experiment Station.



Tietoja Metsäviljelystoiminnasta Suomessa 1923-1930. (German Summary) "Über die Forstkulturntätigkeit in Suomi (Finland) 1923-1930". By Erkki K. Cajander. *Silva Fennica* 22: 35 pp. 1932. Helsinki.

This bulletin of thirty-five pages is the twenty-second of the series of publications containing essays and short investigations

on the subject of forestry in Finland. It briefly covers the activities in forestation in Finland from 1923-1930.

A short resumé of the national forest policy is given. During the first years after the war, after Finland had obtained political autonomy, appropriations for forestry were, of course, small. Later, after conditions became better, appropriations increased. The amount made available for forestry in 1918 was only 570,000 Finnish marks, while in 1929 after the passage of the so-called "Forest Improvement Law," the appropriation had jumped to 12,000,000 marks. However, in 1930 and 1931 due to the world-wide depression, the appropriations again fell off somewhat.

Private forestry in Finland before 1920 had been under the direction of the local agricultural societies. The Finnish Forestry Association which was founded in 1907 acted to some extent as a coördinating agency for the forestry activities of these societies. A separate forestry association performed the same functions among the Swedish provinces of Finland. The activities of these societies were chiefly in the field of forest extension. Later, eight provincial forest commissions which were subordinate to the federal forest administration, were established to enforce the decree of 1917 which was aimed to stop forest destruction. These commissions universally promoted the advancement of private forestry. However, there was little coördination in the activities of these various organizations, so in 1929 the "Private Forest Law" was passed. This act combined all the activities for the advancement of private forestry and delegated them to sixteen silvicultural commissions in the Finnish-speaking portion of the country, and two of them in the Swedish-speaking portion of the country. Two central forestry societies acted as coördinating bodies for

these commissions, both of these societies being directly subordinate to the federal forest administration. Later, an important addition was made to the work of these societies, in that the execution of the portion of the Forest Improvement Law dealing with private forestry was delegated to them. For this purpose these societies formed forest improvement districts—one in each province—and employed trained foresters to carry out the work. Both swamp drainage and forest improvement work on the uplands was fostered by these commissions.

In the Scandinavian countries large forest areas are owned by the wood-using industries. It has proved profitable to them, since they use large quantities of wood, to be able to obtain this raw material from their own forests, and consequently, their forest estates have been put under quite intensive management. The same conditions held true in Finland. Since before the World War, some of these corporations have been widely known for their silvicultural work. The foresters of these corporations in both Finland and Sweden have coöperated with each other.

Both the total forest area and the percentage of productive forest area in Finland is divided by ownerships as follows:

Ownership	Total forest area in hectares	Percentage of productive forest land
Federal	10,049,700	70.7
Private	12,886,100	85.7
Corporations	1,908,100	84.2

Data are given in this publication upon forestation activities in Finland. Those concerning federal forest plantations are thoroughly reliable; however, those concerning private and corporation plantations are taken from various sources and consequently are not as reliable.

Of interest to American foresters is the large proportion of forestation which

is carried on by direct seeding. We find that the area seeded in Finland from 1923 to 1930 totaled 55,576 hectares distributed as follows: 27,506 hectares on federal lands, 12,376 hectares on private lands, and 15,694 hectares on corporation lands. The increase in areas seeded was quite constant throughout this period. In addition to these areas there was also considerable replacement seeding upon federal lands. Seeding activities on private lands showed a peak in 1927 which corresponded with the large exports and attendant high prices of wood products at that time. There was another peak in 1930 which must be attributed partly to the better seed supply and partly to the lower price levels. The amount of seed sown during this same period totaled 63,890 kilograms, with 32,746 kilograms on federal lands, 12,490 kilograms on private lands, and 18,654 kilograms on corporation lands. The average amount of seed sown for this period was 1.12 kilograms per hectare. The methods of seeding upon corporation forests during 1929-1930 were "sowing in patches"—73.5 per cent, "broadcast sowing on the snow"—13.0 per cent, "sowing in rows"—7.7 per cent, "broadcast sowing"—3.8 per cent, and "sowing after working up the soil by various cultivation methods"—2.0 per cent. The amount of seed sown by species throughout the country as a whole averaged as follows: pine—83.0 per cent, spruce—15.0 per cent; other conifers—2.0 per cent, and also a very small amount of hardwood seed which was sown on federal lands.

Forestation by planting is of considerably less importance in Finland. Throughout the period from 1923-1930, a total of 5,341 hectares was planted by all agencies. 4,647 hectares of this total was on corporation lands. The total number of trees planted throughout this period was approximately 17,000,000, about 14,-

000,000 being planted on the lands of the corporations. The average spacing on federal lands was 1.50 x 1.50 meters, on private lands—1.50 x 1.75 meters, and on corporation lands—1.75 x 2.0 meters. The average for the country as a whole was 1.75 x 1.75 meters. For the entire country, 16.0 per cent of the plants set out were pine, 77.0 per cent was spruce, and 7.0 per cent other species. On the federal lands alone, however, 58.0 per cent of the planting was pine, and 26.0 per cent spruce.

A summary of the above information shows that 91.2 per cent of the total area afforested from 1923-1930 was seeded, and 8.8 per cent planted. This condition is largely owing to the cheapness of seeding and to the large amount of forestation which must be carried out on areas which are distant and inaccessible, and would make very difficult planting chances. The average cost per hectare of forestation by the federal Government was around .10 Finnish marks, and that on corporation lands about .75 Finnish marks. This, of course, reflects the relatively greater amount of planting as compared to direct seeding carried on by the corporations. Both of these figures, however, are very low in comparison with our own forestation costs.

PAUL O. RUDOLF,
Lake States Forest Exp. Sta.



The Importance of the Origin of Seed Used in Forestry. By H. G. Champion. *Indian Forest Records (Silviculture Series). Volume XVII, Part V. Illustrated. Calcutta, India. 1933.*

As a result of a resolution adopted at the 1929 Silvicultural Conference at Dehra Dun, Mr. Champion prepared the above bulletin, which includes a survey

of all pertinent information on the subject, its application to Indian species, and suggestions for methods of investigation.

The greater part of the bulletin is devoted to abstracts of European, Indian and American experience. The author gathered his material by a review of over 150 publications, and through contacts with experienced research workers and their projects in Europe.

Recorded information is covered under the following heads: seed collected in one forest or restricted locality; seed collected in different localities; and selective breeding and hybridization.

For seed collected from one locality, large seed gives higher germination and often have enough more initial vigor to plant per cent, and resulting seedlings become dominants in the stand. Dominants of medium size or middle age yield a high proportion of seed of average size or larger. Seed should be collected from trees of good form and structure as morphological variations may be of individual origin. This has been shown in bark variations, left-handed spiral grain, and characteristic foliage and fruit forms. Phenological variations should also be considered, because these characteristics are frequently transmitted through seed. Variations in leaves or flowers are often associated with differences such as relative immunity to injuries, rate of growth, or quality of bole. Differences in frost-hardiness between individuals are well known. Very little is known concerning inheritance of physiological variations in trees. High yielding strains in rubber transmit this quality through seed. It is believed that high resin yielding strains exist in pines. Care must be taken to avoid collecting seed from sports and mutations, unless the variations are favorable, as the variation may show in the offspring.

In collecting seed from different localities, geographical, altitudinal, and soil races must be considered. Geographical and altitudinal races are much more marked in some species than in others. Where climatic differences are not too great it is sometimes possible to import strains having characteristics desired and obtain good results. Rate and form of growth usually vary with altitude and may be inherited. It is usually unsafe to use seed from sources much higher or lower than the elevation of the site selected. Evidence points to the existence of soil races, probably developed by different soil types. Indications are that poor form due to poor soil conditions may be inherited.

Forest tree breeding is recognized as having good possibilities. Up to the present, work along this line has consisted largely of racial selection, taking the necessary care in seed selection and prevention of crossing with inferior stock.

Hybridization has limited value at present, since maintenance of first generation hybrids is confined largely to species which can reproduce vegetatively or produce seed early. The hybrid form can sometimes be obtained from mixed progeny by selection in the nursery beds or by later thinnings.

In coördinating and interpreting experimental results, Mr. Champion explains that various interpretations may be made, owing to different conceptions as to what constitutes a species, race, or variety; the question of whether acquired characters can be inherited; the lack of knowledge of both parents of progeny of forest trees; and doubt as to whether tree characters are due to environment, racial, or individual constitution. It is pretty well agreed, however, that there are differences between individuals which are not caused directly by environment. The explanation of these differences is still theoretical.

The last chapter is devoted to a consideration of the experimental method in problems of origin of seed. The apparent simplicity, but actual elaborateness of preparation and planning required is emphasized. So many experiments to date on these problems are not conclusive due to the small number of trees, or tests used. General conclusions are given regarding data to be recorded for parent trees, collection and storage of seed, selection of plots, size and shape of plots, rearrangement of plots, number of trees, and maintenance of the original comparability between plots.

A. A. HASEL,

CORRESPONDENCE

FOREST UTILIZATION AGAIN TO THE FRONT

Whether or not it be true that the lumberman and the forester, as some would have it, are inherently irreconcilable enemies, who can view each other, when they meet, only with mistrust and mutual misunderstanding, the fact remains that too many of both breeds have been guilty of a common error in their manner of thinking. The lumberman too often has planned and conducted his business in the belief that all he had to do was to manufacture his product in steadily increasing quantity and it would sell itself at constantly higher prices. The forester likewise has been too prone to plan and direct his efforts in the blind assumption that all he had to do was to grow his trees in steadily increasing quantities and they would sell themselves at constantly higher prices.

The old woman who bought her apples at two bits a dozen and retailed them at 2 cents apiece, and looked for her profits in the vast volume of her sales was less illogical. At least she could count on a rapid turn-over. Fortunately the more progressive minds, both in the industry and in the profession, have realized and have been emphasizing for some time past, the importance and the necessity of encouraging and developing forest utilization in all its phases.

Perhaps the recent interchange of letters (reproduced below) between President Chapman of the Society, Emanuel Fritz of the California Forest School, and the Director of the Madison Laboratory, will help the rest of us to modernize our

conception of the forest situation, and to appreciate that there is selling to be done as well as producing, in the successful attainment of the objectives set forth in Article X of the Lumber Code.—EDITOR.

LETTER FROM H. H. CHAPMAN TO
DIRECTOR C. P. WINSLOW

JANUARY 8, 1934

One of the newly elected Council members, Emanuel Fritz, has sent me the following statement:

"Foresters seem to be altogether too complacent about the future of wood as an industrial and construction material. We used to justify our heavy forestry expenditures by the imminence of a timber famine that seemed real at the time, now that conditions have changed we are justifying a continuation and enlargement of these expenditures on other grounds. We can't afford to lose continuously more and more of the market for wood. While it may not be any concern of ours whether or not individual lumbermen make money out of forest products, it is very definitely the concern of the timber grower that there continues to be a large market for his products. We find European foresters actually participating in the promotion of the use of wood. Of the many things that we have copied from the Europeans, why not this one? The U. S. is the largest owner of timber and yet it, officially, seems to care very little if wood is entirely pushed off the market. Most members of our profession outside the government bureaus seem to have the same attitude. But we

can't practice silviculture unless we can cut trees, and we can't afford to cut trees unless we can sell them. Where will foresters be with the market for forest products curtailed still further than the present? Isn't it the job of the grower of *any* product to first ascertain the security of his market? Even the cheese producers a few weeks ago inveigled the public into a national cheese-eating week, and even our famous forestry founder, Governor Pinchot, asked us over the radio to eat more cheese! The U. S. should be as selfish in promoting the use of wood as its forest management offices are eager to increase their timber sales. As a large owner, it should see that its outlet for lumber, etc., is maintained on a very large scale. Timber is the most tangible product of the forest. If its use decreases I am sure the public will not long stand for such heavy expenditures for the intangibles. Forestry is on a grand honeymoon just now with expenses paid by a rich uncle. The honeymoon can't last and soon the couple will have to settle down and carry on its housekeeping on its own resources. So-o-o, I urge once more upon the Society that it lend its aid to making the market for forest products secure. It can make a start in this by helping change the disinterested attitude of its own members and by urging the government bureaus to help make the people "wood conscious."

I wrote him that I could hardly agree with this general proposition in view of the activities of the Forest Products Laboratory, but that possibly there might be other lines open to the Forest Service for advertising or promoting the use of wood which had not been sufficiently taken advantage of. Certainly before the Society makes any suggestions I would wish full information which would put us in a position to judge regarding this matter.

E. F. WHITE'S REPLY TO H. H. CHAPMAN,
JANUARY 29, 1934

Your reference to the activities of the Forest Products Laboratory as a factor offsetting much professional and official indifference to utilization economics is highly appreciated. However, when we consider what has happened to the total and per capita consumption of wood since 1909, and when we realize the minor position that utilization still holds in the thought and language of the average forester, and when we face the fact that the maximum appropriation for forest products research by the government is nominally only a half a million dollars (which was cut \$100,000 in the economy drive) we are bound to admit that somehow the utilization concept has not yet "rung the bell" effectively.

It is the expressed plan of the Administration to provide permanent rural employment to some two million workers on the basis of improved forest land use and decentralized industry. Should we not think our way through to the *market* for the product of all this labor? England since the War has tried the rural-forestry employment experiment on a considerable scale but at the latest report had to shift most of the workers back on the dole. The process of decentralizing and grouping forest industries around certain products will alter existing practices in manufacture, kiln drying, and fabrication, which will require extensive professional and research knowledge as well as intimate acquaintance with the properties and use values of the products.

The lesson for us in all this should be plain enough. But forestry plans sometimes seem to be spun out of thin air or built on foundations of 50 years ago, ignoring the substance and spirit of this industrial age. If my interpretation is correct, I

cannot too strongly point to the fact that the trend of modern industry *is away from the use of wood*. Metals, concrete, and synthetic products are the big news in materials today. Special properties and adaptations are developing at a rapid pace and one by one the markets for wood are undermined or cut away. These materials are being developed and promoted with the continuous aid of scientific research. In one material alone, steel, research work and funds devoted to its development and use in the last two decades probably exceed the entire research endeavor in wood utilization since the beginning of time.

Why it is that foresters generally fail to grasp this fundamental tie-up between research in forest products and the ultimate market for forest crops, I do not understand; or why, if they do recognize it, they acknowledge it in a perfunctory way and assume a by-stander attitude. I for one do not understand how they can passively acquiesce in the present greatly extended forestry program without thinking their way through or raising the question as to whether this vast expenditure has any reasonable chance of approximate self liquidation as the President intends.

Please do not think that the Forest Products Laboratory is in any way opposed to the extensive enlargement of the forestry program now in motion. It takes issue only on the point that the amount of effort devoted to efficient and profitable conversion of the stand is out of all proportion to the expenditures for production and protection.

I am glad indeed that Fritz has broached this subject and I hope that the Society may feel as we do here that agitation for market insurance of our future forest crops will have a profound influence on the long-range outcome of the extensive forest plans now under development.

"DEAD WOOD LYING ON DUFF DRIER THAN IN AIR"

Editor, JOURNAL OF FORESTRY,
Washington, D. C.

Dear Sir:

We can always learn!

Gisborne's article in the JOURNAL OF FORESTRY for December, 1933, makes the surprising statement that measurements taken by him show that dead wood supported ten inches above the duff contains two per cent more moisture than that on or under the duff, and reasons that decay in sticks above the ground should be more rapid due to moisture conditions more favorable to bacterial and fungal action. If this reasoning is correct we can expect to find vineyard and tomato stakes rotting off above the ground; our fence posts and telephone poles no longer decaying most rapidly at the ground line; our log cabins rotting down from above, and not merely the sill log; that it is no longer necessary to require that special use cabins be on rock or concrete foundations; ad infinitum.

However, Gisborne apparently agrees with Mark Twain that "there are plain liars, damn liars, and statistics" for in his last sentence he calls attention to the fact that duff at its driest burns only slowly and to stop a fire the first thing to do is remove the dead wood above. We can check him one hundred per cent on this and it is for this reason that we wish to see our thousands of acres of cyclone material and slash from C.C.C. thinnings moved or reduced to duff as soon as possible.

GALEN W. PIKE,
Black Hills National Forest.



A SIMPLE DIAMETER TAPE

Editor, JOURNAL OF FORESTRY,
Washington, D. C.

Dear Sir:

The December, 1933, issue of the JOURNAL OF FORESTRY contains a note by

Craighead on the use of cellophane and a narrow strip of tracing cloth for measuring the diameters of small trees. I wonder if foresters would not be interested also in another tape which does a very good job not only on reproduction but on trees up to 24 inches in diameter.

The tape in question is a steel snap tape modeled after spring tapes that women use for measuring when dressmaking. I believe it was Frothingham who adapted the principle some years ago, and certain members of the Appalachian Forest Experiment Station have been using it successfully ever since. One of the weaknesses of the very narrow thin tape was its tendency to break, particularly at the end where the ring is attached.

Recognizing this weakness several years ago I had the Lufkin Rule Company design a somewhat sturdier type. At that it weighs only 3 ounces, is only 1.9 inches across, and half an inch thick. It has a

snap button in the center on one side. The tape itself is .004 inch thick and .37 inch wide. The same dies which have been used on the standard 20-foot Forest Service tape for years were used for the lettering and figures. Lufkin put a hook on it but that is not necessary because one can throw a tape around trees 24 inches or less. Without the hook it would be far less apt to catch in brush.

This new type has been used a lot by several different men on small timber and works very nicely. The snapping is a great convenience and saves time. One has to be careful in snapping back to guide the tape with his thumb so the sides of it do not cut the thin brass case, but that becomes habitual after a while, and one finds himself moving rapidly from tree to tree without the delay of hand winding.

J. B. CUNO,
Forest Products Laboratory.



SOCIETY AFFAIRS

DOINGS OF THE EXECUTIVE SECRETARY

The proceedings of the Society's 33rd annual meeting monopolized the February issue to the exclusion of everything else. This report, therefore, covers activities of the 60 day period beginning December 11.

December 15 was election day. With the exception of time out for luncheon with Dean Graves to discuss the progress of plans for the second conference (in January) on Article X of the Lumber Code, the whole day was devoted to helping the tellers count the ballots. The results of the election were announced at the annual meeting and in the January JOURNAL. The remaining nine days before Christmas were occupied with preparations for the annual meeting and, in co-operation with other individuals and groups, in preparation for the January conference on Article X of the Lumber Code, of which a full account appears in this issue.

It was necessary to leave Washington on the 26th in order to reach Milwaukee a day ahead for the completion of final arrangements for the annual meeting beginning on the 28th and extending through the 30th. During these three busy days there were in the evenings two informal meetings of the Council and a forest education conference. There could not be a formal Council meeting because there was not a quorum either of the old or of the new Council. However, the seven old and new members who were in attendance were able to meet informally with the out-going and incoming presidents and agree tentatively on Society plans and policies for the coming year, which President Chapman, as soon as he

took office on January 1, could submit to the new Council for formal action.

The educational conference was participated in not only by the forest school representatives, but also by administrative foresters who employ forest school graduates and therefore had constructive suggestions to offer concerning their training. This conference (report of which appears on another page) resulted in an application to the Council under Article XII of the Constitution for permission to organize an Educational Division of the Society.

While the annual meeting terminated at noon on December 30, it was necessary for the executive secretary to stay over an extra day to "mop up."

After New Year's it was necessary to be in Statesville, North Carolina over January 5 and 6 for the annual meeting of the Appalachian Section. The week beginning January 22 was given over entirely to the Article X Conference. Being secretary of the Executive Committee, as well as a member of one of the six Conference Committees, the Executive Secretary had to defer attention to regular Society business until later.

On February 2 the mid-winter meeting of the New York Section was attended at Albany. The days in between and subsequent have been occupied with getting, first the February and then the March issues ready for the press and catching up with accumulated correspondence. It has been an active two month's period, and, it is believed, a profitable one for the Society and the profession.

FRANKLIN W. REED,
Executive Secretary.

CONFERENCE ON THE EDUCATION OF
FORESTERS, MILWAUKEE, WISCONSIN,
DECEMBER 29, 1933

At the suggestion of Dean Samuel T. Dana, of the School of Forestry and Conservation of the University of Michigan, tentative arrangements were made with members of the faculties of other schools of forestry to hold an informal conference on educational problems of general interest in connection with the annual meeting of the Society of American Foresters in Milwaukee. Friday evening, December 29, being open, a group of thirty-nine men met on that day at an informal dinner, which was followed by a discussion. This statement is a report of that meeting. It includes certain recommendations made by the group to the Council of the Society.

Dean Dana opened the meeting with brief references to the last formal conference on forest education, that was held in New Haven in December, 1920, and to the outcome of the work of the Society's Committee, The Forest Education Inquiry—the publication in 1932 of the book by Dean Graves and Professor Guise, "Forest Education." He then enumerated the topics, (Table 1) suggested to him by various men, as being subjects which such a group as that now assembled might well desire to discuss.

By a unanimous vote Dean Dana was chosen chairman of the meeting, and Prof. Ralph S. Hosmer of Cornell University Secretary. By common consent the topic selected for first consideration was "The period necessary for the undergraduate preparation of men for forestry: four versus five years."

To open this discussion Dean Dana read portions of letters from Prof. J. A. Ferguson, Penn State College, and from Acting Dean I. W. Cook, University of Montana. Ferguson questioned if the rather general introduction of the junior college idea will not force "the addition

of a graduate year to complete the professional forestry course in the future?" Cook held that "a forestry degree should not be officially recognized unless it carries the equivalent of the Master's rating," and that it is "impossible to prepare students in four years to meet the requirements of the Forest Service."

Prof. Fay G. Clark, University of Montana, made a plea for a course, preferably of 4 years, that should give a solid foundation in forestry, leaving specialization to the graduate years. He suggested that the emphasis should be on the satisfactory completion of a well rounded curriculum, not on the time it took to accomplish this. Too many mediocre men are being sent out now by all the schools.

Prof. Henry Schmitz, University of Minnesota, spoke in support of a five year course.

Prof. Paul Herbert, Michigan State College, proposed a five year plan with $2\frac{1}{2}$ years given to basic subjects, and $2\frac{1}{2}$ years to technical forestry; the B.S. degree to be given at the end of five years; with another year of graduate study if one wished the M.F.

Prof. Burr N. Prentice, Purdue University, spoke of certain administrative difficulties in schools with "honor lists," which often made it necessary to spend five years to complete the undergraduate course.

Dean S. N. Spring, N. Y. State College of Forestry, stressed three points: (1) That the determination of what time is needed depends on the requirements of the industrial or governmental concerns that employ foresters. He cited the full schedules of certain engineering schools as one way of meeting this problem within time limits, though he felt personally that a wiser plan was to spread the work out through five or six years, including the years of graduate study. (2) The effect on the budget of the student's family of a course longer than four years is in many cases a determining factor. This

consideration should not be overlooked. (3) Orientation work at the start, either by a course, or preferably a short period in camp, whereby those unfitted for forestry are weeded out. Subsequently those who are left can be given a stiffer curriculum, because they are really interested.

Professor Schmitz thought that the Forest Service holds the key. If an examination were set that demanded five

years of preparation it would raise the standards of the schools.

Director C. F. Korstian, Duke Forest, Duke University, agreed that a foundation in the basic and allied subjects, of perhaps three years after high school, should precede technical forestry courses. This would ordinarily require five or six years in all, but the honor men would be left free to go faster if they demonstrated ability to do so. Korstian would like to

TABLE I
TOPICS FOR DISCUSSION

Subjects	Proposed By
Fields of study for separate programs, to train men for the jobs they will be called on to do; recreation, soil conservation, reforestation, management of marginal agricultural lands.	Prof. C. M. Genaux University of Idaho
Teaching of fundamental subjects: How to keep students interested. Forestry courses in early years.	Prof. Karl W. Woodward University of New Hampshire
Development of junior colleges may necessitate starting forestry after two years. Will a year of graduate work be necessary to complete professional training in forestry?	Prof. J. A. Ferguson Penn State College
Rating or accrediting of schools.	Dr. C. F. Korstian, Director Duke Forest, Duke University
Fields of concentration. Specialization a matter of graduate study. Language requirements.	Prof. R. S. Hosmer Cornell University
Trends in forest research and their influence on state research programs.	Prof. Henry Schmitz University of Minnesota
Methods of teaching, including field work.	Dean S. N. Spring N. Y. State College of Forestry
Need of five year curriculum; changes in curricula to meet new developments. High school orientation for prospective foresters.	Prof. G. B. MacDonald Iowa State College
All schools to require the equivalent of a five year course for the Master's degree, and no forestry degree to be officially recognized unless it carries Master's rating. Forest Service requirements now rest on a 4 year course, vocational in character.	Prof. I. W. Cook University of Montana
Definition of the Master's degree.	Prof. Paul A. Herbert Michigan State College
Compulsory forestry courses in agricultural colleges.	W. M. Baker Central States Forest Exp. Sta.

see the "forestry brand" withheld until the student had given evidence that he had satisfactorily completed the whole course.

Prof. G. B. MacDonald, Iowa State College, urged that a small amount of technical work be given early in the course, together with some field work. Those students who do best are the ones who get field training. This plan also develops interest in forestry in the student body.

Prof. J. L. Deen, Penn State College, here asked Prof. H. H. Chapman what the experience at Yale had been as between men coming to the Yale School of Forestry with a B.A. degree as against those who had received the B.S. after four years in a forest school. Chapman's reply indicated that while Yale had had many good men who entered with the B.A., those from the undergraduate forest schools usually were able men who knew why they were there and what they wanted.

Schmitz called attention to Ben Wood's "Study of Pennsylvania Universities" as a suggestive book. The findings, based on 8,000 individuals, tended to show that the important thing was the educational objective of the individual student, not the course or department in which he had registered.

In answer to a question by Prof. J. A. Larsen of Iowa State, as to what he would eliminate to bring the curriculum down to four years, Dean Spring replied that it is not so much what is in the curriculum, as how it is given. Every school should question itself as to whether the courses are really accomplishing what they are supposed to give. Can not some be reduced in time, to advantage, or combined? Are all those listed as prerequisites really essential, and the like. The time saved in such ways can be used profitably for essential subjects.

Prof. J. H. Allison, University of Min-

nesota, questioned whether in many state colleges it was not accepted that if a student did the required work he was given the B.S. degree, and if it was not often necessary to conform to that custom.

Prof. H. S. Newins, Michigan State College, thought that more coördination between the various forest schools would be desirable.

In answer to a question as to what should constitute the curriculum required for the B.S. degree, Dean Dana read the table on pages 182 and 183 of "Forest Education," as constituting the standard suggested by Dean Graves and Professor Guise.

Prof. D. B. Demeritt, Iowa State College, made the point that the majority of American schools of forestry were at state institutions where the policy is that whoever was admitted has a right to an education. He thought greater strictness should be exercised at admission, and cited with favor the usage at Penn State, which does not accept applicants unless they are in the upper two-fifths in grade upon graduation from their high schools. Dana suggested that some of those of lower grade might be ranger school material. To this Schmitz added the comment that some Forest Service rangers found ranger school men better suited than college men for work on the national forests.

Prof. H. P. Brown, N. Y. State College of Forestry, expressed the idea that learning how to think is what really constitutes an education. And that for this four years was as good as five. The forest schools of today are not teaching men to think. He favored a comprehensive oral examination at the end of the fourth year as one way to meet this problem. Then let the man go on to graduate work if he has the ability. Dana commented that while we must teach students to think, we must also give them certain

specific information and that the discussion under way turned on what and how much should be included in the professional forestry curriculum.

Dr. C. D. Howe, of the University of Toronto, said the secondary schools were in part to blame for not laying proper foundations for sound thinking. To this several hastened to agree, although this phase of the subject was not developed further. Brown added that there was danger of starting professional work in forestry too soon and that much that was now attempted was too highly specialized. Quality rather than quantity is what is needed.

Herbert, reverting to his earlier suggestion of a division of the forestry curriculum as between basic and professional subjects, said that he would also include some cultural courses, but by this he meant not mathematics or foreign languages, but such things as social science, psychology, civics, several courses in political science, and labor economics. If it is taught properly any subject will train a student to think, said he.

Mr. A. C. Shaw, Assistant Regional Forester (Lands), Region 9, Forest Service, here introduced a new note by comments on his experiences as a supervisor, in all sorts of Forest Service work, with men from various forest schools. His conclusions were that the trouble was not so much the subjects men were taught in the schools—for some M.F. men failed as badly as those with the B.S.—as, first, laziness, both physical and mental, next inaccuracy, and third inability to express themselves clearly either in written reports or orally. Shaw then made these more specific comments. In the schools a man who turns in a poor report with a number of mistakes is allowed to get by with a low C. When he comes to prepare specifications on a national forest job like mistakes cost the government many dollars in real money. The ability

to use correct and forcible English is essential in forestry. The forest schools should pay much more attention than they now do to this.

In the administrative work on national forests it is of great help to have an understanding of local government functions; what the duties are, say, of the sheriff and other local officials. This should be covered at the school. And after a year or two young foresters have need for the background of economics and the social sciences which they should have got in college, to give them an understanding of the human problems they meet. Men break down not from lack of technical knowledge, but from failure to be well grounded by a broad foundation.

Shaw further suggested that he thought the schools could learn much of value if they would systematically follow up their graduates and learn why some men made good while others did not. Such knowledge ought to be of help in making adjustments in the curriculum.

Prof. Charles G. Geltz, Purdue University, spoke of the system in use at the Ranger School of the N. Y. State College of Forestry at Wanakena, where the class entered with a probationary period of one month, followed by an intensive examination which materially reduced the number. Another examination three months later eliminated more, so that for the rest of the year the class consisted of the "cream of the crop." After the intensive field work of the summer still more were dropped, consequently those who were finally graduated were a picked lot. In our four year courses we too often carry along mediocre men, for one reason or another. It would be better if we adopted as drastic methods with them as with the ranger school boys.

MacDonald said that men are put to the test very soon after they get into the field. Those who can tackle practical problems

efficiently seem to make the better start. We therefore need to turn out men from the schools who will get results. To this Dana replied that with the very rapid development and expansion of forestry in recent months we also need men with sufficiently thorough training, based on a sure and broad foundation, to be qualified to handle the larger questions which arise.

Professor Clark, University of Montana, said the difference between forestry and the other professions, like law or medicine, is that in these the practitioners all have to take full training before they are admitted to practice. In forestry we do not go nearly that far. Korstian thought that those unsuited to forestry could be prevented from entering the schools by personal conferences before and during registration.

Prof. Nelson C. Brown, N. Y. State College of Forestry, explained the operation of the optional pre-freshman camp at Syracuse, to which the men of the entering class go for a short period of intensive forestry work of varied character, just before registration. Some drop out then and there.

The hour of adjournment, 10 o'clock, then being at hand, the remainder of the meeting was devoted to consideration of the following suggestions and recommendations.

Prof. D. M. Matthews, University of Michigan, suggested that conferences of this type be repeated whenever possible in connection with the annual meetings of the Society, and that by pre-arrangement there be present men representing the Forest Service and the forest industries, as well as school men, so that the discussions may include more angles of approach and so prove more vital.

Dean Dana reminded the group that the constitution of the Society of American Foresters provided, in Article XII, for subject matter divisions. This would seem to give authority for just such con-

ferences as this, in the arrangement of annual meetings.

On motion made by Professor Schmitz it was voted that the group assembled in the Forest Education Conference at the Milwaukee meeting petition the Council of the Society to authorize the establishment of a subject division or Education in Forestry, with the expectation that this might lead to the organization of other subject divisions and with a view to holding another conference on education at the annual meeting of the Society in 1934.

It was further moved, on motion of Prof. D. Den Uyl, Purdue University, that if the Council approve this petition, the chairman of the 1933 Conference, Dean Dana, be authorized to appoint and serve as chairman of a committee to function for the division of Education until its next meeting in such ways as the committee may deem wise and desirable. This was passed unanimously.

Professor Schmitz said that to start the discussion it might be desirable to have two or three short statements on live topics, but that it should be left to the special committee just recommended to make all such arrangements.

Dean Dana said he thought one live topic for discussion at another conference might be a critical consideration of just what should constitute the distinction between the degrees of B.S., in forestry, and Master of Forestry. This would include also the topic of the minimum number of credit hours, or other requirements, demanded for each of these degrees. Some one else said that in the topics read by Dana at the start of the meeting there were several worthy of consideration.

Dr. C. M. Granger, Forest Service, President of the Society, called attention to one phrase of Article III, Section 3 of the Society's constitution, which reads: "Junior members shall be graduates of a school of forestry *approved by the Council*." The Council has never taken action

under this clause, but it must soon in view of pending questions as to the revision of the standards governing admission to the Society. The Forest Education Inquiry has pointed out certain glaring weaknesses in forestry education in America. These demand the consideration of all the forest schools. One of them is inbreeding in a faculty. Where such a condition obtains it is not surprising that the students are not taught to think. As the Society approaches the matter of at least naming the schools which shall be on the approved list required by the constitution, these are matters that deserve and demand study.

Professor Schmitz said that while Dr. Granger, a representative of the Forest Service, was present he wanted to say that he and others felt strongly that the Forest Service had lost a real advantage when it ceased, three years ago, to take on forest school students for summer work, even if at as low a wage as \$30 a month. Prior to that year, the undergraduates of schools were able to secure two years of summer experience on national forests.

Dr. Granger replied that he supposed the change of policy had been due to the necessity of making places for locally unemployed men in the vicinity of the forests. It was then moved by Professor Herbert, Michigan State College, and voted that the chairman of the meeting, Dean Dana, be requested to prepare a letter covering the matter raised by Professor Schmitz for submission to the Forester, and to the President and Council of the Society, as expressing the feelings of the forest school faculties on this subject.

Prof. R. S. Hosmer, Cornell University, called attention to an article by Prof. Cedric H. Guise of Cornell giving up-to-date statistics and other recent information about the forest schools of the United States, which is to appear in an early number of the JOURNAL OF FORESTRY.

These data supplement and bring down to 1933 some of the similar tables in "Forest Education." Mr. Hosmer also mentioned an offer made by Professor Guise that, if it was desired, he should be glad to prepare each year, for publication in the JOURNAL, revisions of the essential statistics of the American forest schools, thus making it easy for those interested to have access to these figures. This suggestion met with the approval of the group and it was *voted* that it be recommended to the President and Council of the Society that Professor Guise be favorably considered as a member of the Society's Committee on Education, and that he be designated as the one authorized to compile and publish such forest school statistics.

The meeting then adjourned, after a session of about two and a half hours, at 10:10 P. M.

RALPH S. HOSMER,
Secretary.



COMMITTEE ON COÖPERATION TO IMPROVE EXPLOITATION PRACTICES

It is assumed that any scheme for improving exploitation practices has in mind not only the utilization of the maximum merchantable per cent of the raw wood content of every tree which is cut but also leaving the non-merchantable stand in such condition that it may furnish later crops for an indefinite period. The attainment of these objects is possible only when the operator can derive a reasonable profit from harvesting his crop, converting it into products which the market demands, and in distributing the finished product to consuming centers. In other words, an effective and improved form of utilization must cover all of the various factors, from "tree to trade,"

with which the lumberman is concerned. Improved logging procedure may be offset by improper manufacturing procedure or vice versa, and an inadequate or improper merchandising policy may offset the benefits derived from a skillful and efficient production technique.

The potential field of activity of the committee, therefore, is a very wide one, although in the charge to the committee in 1932, the Society presumably confined its activities to logging procedure. I feel that the scope of the committee should be enlarged to cover those portions of the activities from "tree to trade" which have a specific influence on the degree of utilization which the individual operator can practice.

The committee at the last annual meeting submitted a brief report concerning its activities during 1932, accompanied by a report prepared by A. J. Brandstrom which set forth the preliminary results of the selective logging study which was then under way in the Pacific Northwest. The final results of this study were published in June, 1933, by the Charles Lathrop Pack Foundation and constitute the outstanding contribution to the problem of improved utilization practice in the Douglas fir or any other forest region.

There is great need for a similar type of study in other regions because a sound basis of improved utilization cannot be developed until the proper operating technique is thoroughly understood. The promotion of such studies in the more important forest products producing centers may well be one of the fields of Society work in the future.

The effect on improved utilization of the actual and proposed changes under the N.R.A. remains to be seen. If they realize the hope of their advocates they should greatly stimulate improved utilization but until the fate of Article X of the Lumber Code is settled, it seems doubtful

that much support can be found for any new or revised program of utilization.

R. C. BRYANT,
Chairman.



REPORT OF THE COMMITTEE ON FIRE CONTROL

Your committee on fire control has no report to submit at this year's annual meeting.

As chairman of that committee I have endeavored to obtain the reaction to the present Clarke-McNary coöperative policy from committee members throughout the country and it all boils down to about this. There is no constructive criticism to be made of the present coöperative forest protection policy under the Clarke-McNary law. All of the suggestions made have to do with performance under the policy and are largely local in character which indicates that there is a lack of understanding on the part of the states and their coöperators as to just what the federal government expects of the states in return for federal aid. This condition may or may not be general. It is the case in Oregon, for example. I am assuming that the Clarke-McNary agreement between the government and the state forester of Oregon is a form agreement used generally throughout the country. Its terms are general. Therefore, it leaves room for misunderstanding as to just what the state and its coöperators are agreeing to do.

It is true that through inspection the Forest Service have done a very excellent job of elaborating on this agreement through contact with the coöperative forest officers, but this happens after the agreement has been entered into, and is often productive of misunderstanding because the Forest Service and its coöperators did not have the same idea as to

what the agreement was at the time it was entered into.

Performance under the Clarke-McNary policy could unquestionably be improved and misunderstanding avoided, if the agreement with each state covered in detail as nearly as possible just what the Forest Service expects from the state and its coöperators in return for federal aid.

This, then, may be considered the report of the chairman of the committee on fire control.

Since going into this question, many things have happened. The forest industry of the country is now committed to a policy of sound forestry practice. All efforts of the industry under the new policy will be confined very largely to the operating area. The regulations that the industry imposes upon itself will have to do largely with fire protection and other forestry measures on and near to the area of active operations. The success of the whole program will depend on tying in this effort on the operating area with a sound forestry policy on the non-operating areas. For instance, if the industry requires itself to use every precaution against the start and spread of fire within its operations, it should have through state law and its enforcement the same protection against the public (recreationist, berry picker, incendiary) on areas that have been and are to be operated.

If we are now to have a conscious effort on the part of the operator to leave forest lands productive, this effort should be tied into that which is available under the Clarke-McNary coöperative policy to the end and all expenditures of money and effort, state, federal, and private, within a region, will be made under one policy of sound forestry.

The Society of American Foresters might well function through local committees to promote conditions under which all forestry effort will be expended under the same program of sound forestry policy for the Nation.

R. H. CHAPLER,
Chairman.



REPORT OF THE COMMITTEE ON SAMPLE PLOT PROCEDURE

The Committee on Sample Plot Procedure has actively pushed this year, the completion of a manuscript on this subject. This is now in an advanced state of preparation and it is hoped that it will be published as a Technical Bulletin of the Department of Agriculture.

In view of the completion of this manuscript, it is suggested that the committee be discharged.

E. N. MUNNS,
Chairman.

PERSONALS

Allen W. Goodspeed, Assistant in Applied Silviculture, Yale University, has been appointed Associate Professor of Forestry, University of Maine, effective January 1.

George W. Peavy, dean of the school of forestry, has been appointed president of Oregon State College, Corvallis, Oregon. He is completing his 24th year at this institution.

Cedric H. Guise, Department of Forestry, Cornell University, was promoted to a full professorship at Cornell, effective October 1, 1933.

SECTION NEWS

Central Rocky Mountain

A dinner meeting of this Section was held at Denver on the evening of January 26, 1934. Forty-three men were present, of which twenty-four were members and nineteen were guests. The guests were largely superintendents and forestry foremen from three C.C.C. camps located on the Pike National Forest.

A business meeting preceded the program. The Section voted to continue its affiliation with the Colorado Engineering Council and to discontinue affiliation with the American Engineering Council. A vote favored not holding the annual Society meeting with the American Association for the Advancement of Science, and favored holding the annual meeting during the period from January 10-20. The Chairman was empowered by vote to appoint a membership committee to pass upon applications for Senior membership, and for Junior membership when the applicants are not forestry graduates.

Huber C. Hilton, Supervisor of the Medicine Bow National Forest, one of the delegates of this Section to the Milwaukee meeting, gave a very complete and interesting resumé of the meeting. Marvin Klemme of the Routt National Forest, also a delegate, presented his impressions and reactions.

P. V. Woodhead, Supervisor of the Routt National Forest, as author presented a very complete and interesting paper entitled "Lodgepole Pine Thinning Policies and Practices in Region Two." The discussion which followed was in close agreement with the paper. Points such as: necessity of adequate fire protection funds for thinned areas; probabilities of windthrow; development of wind firmness in thinned stands; thinning

aspen where it overtops pine; and the relative difficulty of fighting fires in thinned and unthinned stands were discussed.

A paper by John H. Sieker of the Harnett National Forest entitled "Thinning in Stagnant Stands of Ponderosa Pine" was read by Chairman W. J. Morrill. The author covered thoroughly the factors which governed the formulation of the present thinning policies and practices in ponderosa pine.

K. J. Helmick, Supt. of the Manitou C.C.C. camp on the Pike National Forest explained the construction by C.C.C. men of the relief map of the Wichita National Forest, which was on display at the meeting.

New York

Professor A. B. Recknagel of the Department of Forestry at Cornell University, has been active in helping frame industry action on conservation under Article X of the Lumber Code. He attended the first conference in Washington, October 23-26, 1933, where he served as Secretary of the Committee on Farm Woodlands. At meetings of northeastern timberland owners and operators in New York on December 5 and January 3 and 4, he helped to frame the proposed Code Supplement on conservation measures for the Northeastern Division. He again represented the Northeastern Lumber Manufacturers' Association as one of its official delegates when the conservation conference reconvened in Washington, January 22-25, 1934.

By special invitation of the Lumber Code Authority he was in Washington in advance of the conference to help in harmonizing material from the various divisions.

Samuel N. Spring, Harry P. Brown, Nelson C. Brown and Frank B. Myers of the New York State College of Forestry attended the annual meeting of the Society of American Foresters in Milwaukee during the Christmas holidays.

Henry F. A. Meier, William M. Harlow and Vernon A. Young and Fred W. Fletcher of the New York State College of Forestry attended the A.A.A.S. winter meetings in Boston during the Christmas holidays.

Professor Nelson C. Brown of the New York State College of Forestry sent a questionnaire to members of all classes back to 1925 in which information was requested regarding employment and desire to become members of the Society of American Foresters. These questionnaires were mailed during the summer and fall and have resulted in 96 of the alumni expressing their desire to become members of the society.

These questionnaires also brought out many interesting facts concerning employment in C.C.C. Camps and laid a foundation for a possible history of the alumni in connection with this portion of the recovery program according to the suggestion of Professor Brown.

ANNUAL MEETING

The annual meeting of the New York Section of the Society of American Foresters was held Friday, February 2 in the legislative hearing rooms of the new State Office Building, Albany, New York. Some 90 members of the Section were in attendance. The Section was particularly fortunate in having as their guests President H. H. Chapman of the parent Society and Franklin Reed, the Executive Secretary.

The morning session was devoted mainly to matters of routine business, com-

mittee reports, etc. The Section went on record as favoring an amendment to the Constitution more definitely delineating the qualifications for Junior membership and setting up a new status of "Affiliate member" in accordance with the ideas of the new president, H. H. Chapman. The Section also went on record as not favoring conjunction of the annual meeting of the Society with the meeting of the American Association for the Advancement of Science either in time or in place. As for the time of the annual meeting, the New York Section favored a date subsequent to the Christmas-New Year period and at the discretion of the Council, suggesting, however, that consideration be given to a time as nearly coincident as possible to the mid-year examination interval of the different colleges. The New York Section also favored Boston as the place of the next annual meeting provided that the New England Section was still desirous of acting as host.

The first part of the afternoon session was mainly devoted to consideration of the work of the Civilian Conservation Corps. Colonel John S. Woodward, Second Corps Area of the U. S. Army, was the guest of honor and told of the work and difficulties of mobilization. Other speakers were Nelson Brown, W. M. Foss, C. W. Mattison, R. D. Adolph and W. G. Howard.

The second part of the afternoon session was devoted to consideration of the Lumber Code. A. B. Recknagel discussed its history and development and spoke on it from the standpoint of the lumber industry. H. L. Churchill presented a fine paper on its prospects and development as viewed by a practising forester.

The evening session was a banquet session. Burton Adams acted as toastmaster. Speakers were H. H. Chapman, Colonel John S. Woodward, Franklin Reed, Clyde Leavitt, S. N. Spring, A. F. McCarthy, A. S. Hopkins, Charles S. Barker and Hon.

Lithgow Osborne, New York State Commissioner of Conservation. Resolutions were adopted favoring continuation of the C.C.C. work and protesting against continued or further salary cuts in the technical branches of the various federal services.

Officers for the coming year are: H. P. Brown, Chairman; William M. Harlow, Secretary-Treasurer.

North Pacific

The meeting was held at the Portland Chamber of Commerce, starting with a dinner at 6:30 P. M., November 15, 1933. Chairman H. J. Andrews presided. Total present 42.

The chairman stated that the program committee planned to make all meetings instructive and entertaining and also mentioned that he hoped the Seattle Section would arrange for several meetings during the year. He requested both the membership committee and the individual members of the local section to make every effort during the year to get all eligible candidates for junior membership in the Society and also to recommend all legitimate promotions to senior membership.

During a brief business meeting the report of the out-going Secretary-Treasurer, R. E. McArdle, was read and accepted. A motion by McArdle that the dues for this section be at the uniform rate of 50 cents per year including 1933 was carried. Motion by McArdle that this section memorialize the parent society requesting that parent society subsidize local section up to 50 cents per member and thereby eliminate all local dues was not carried.

At the close of the business session Mr. Brundage led in a tribute to Major R. Y. Stuart.

W. C. Ruegnitz, President of the 4L organization, was the first speaker during the program part of the meeting. His topic "Labor's Interest in the Lumber Code" was presented in such a way as to hold the interest of everyone present. He described the legislation leading up to the labor provisions that are included in the National Industrial Recovery Act and stressed the importance to the industry of uniform work hours provided by the code.

Thornton T. Munger, Director of the Pacific Northwest Forest Experiment Station, who had just recently returned from Washington, D. C. where he attended the conference to consider Article X, the conservation section of the lumber code, gave a brief resumé of the purpose of the conference and of the topics considered.

Lynn F. Cronemiller, State Forester of Oregon, spoke briefly on forestry legislation that may come before the special session of the legislature.

During the discussion period several members enlivened the meeting by giving their reactions to certain provisions of the lumber code.

A meeting was held December 15, at the Portland Chamber of Commerce starting with a dinner. Chairman H. J. Andrews presided. Total present 57, of whom 35 were members of the Society.

Minutes of the last meeting were approved. Mr. Keen announced that the program committee welcomed suggestions from the members as to topics for discussion. R. H. Chapler was named chairman of the music subcommittee and was requested to arrange some musical numbers for each future meeting. Mr. Andrews called attention to the annual meeting of the Society to be held at Milwaukee, Wisconsin.

J. C. Evenden, J. M. Miller and Dr. K. A. Salmans, visiting forest entomologists, each spoke of recent developments in forest insect research, including new methods of control, solar treatment, new projects involving determination of factors lying behind sudden outbreaks, and solutions.

R. A. McArdle, Wm. Morris and D. N. Matthews discussed the following phases of the Tillamook Burn of 1933: fire area and history of progress, velocity and direction of wind, relative humidity, amount and condition of forest fuel, relative precipitation, combination of adverse factors, comparison with other areas and seasons. These discussions were illustrated by maps and graphs.

Lynn Cronemiller, Oregon State Forester, picturesquely presented scenes from the front lines of the fire from start to finish, bringing out fire fighting problems encountered, the effect on plant, animal and fish life, the condition of the soil, and many human interest phases.

E. H. McDaniels, Clarke-McNary inspector, spoke of the ECW part in the fire; the number of men employed, camp organization, mobilization and character of work done.

E. B. Tanner discussed the owner's problem in salvaging burned timber, including inventorying and setting up comparative values for cooperative undertakings, engineering, time, quota, finance and marketing problems.

Northern Rocky Mountain

L. F. Watts, chairman of the Northern Rocky Mountain Section has announced the following tentative subjects and speakers for the winter meetings:

December 11—Business meeting, followed by K. D. Swan's moving pictures of C³ work, explained by R. F. Hammatt.

December 18—“The Fort Peck Irriga-

tion Project,” explained by L. A. Campbell, Agricultural Development Agent for the Northern Pacific Railroad.

January 8—“The Land Ownership Situation in Eastern Montana, and Its Solution” by R. B. Tootel, Professor of Agriculture Economics at Montana State College of Agriculture.

January 22—“Lumber Production and Price Control Under the NRA,” joint meeting with Missoula Hoo Hoo Club, speaker to be selected by this club.

February 5—Joint meeting with University of Montana Forestry Club. Program by the Club.

February 13—Discussion of Article X of the Lumber Code and its significance to private forestry in Region One, led by C. L. Billings, General Manager, Potlatch Forests, Inc.

February 26—“Forestry and Social Relief in Montana,” by T. C. Spaulding, Montana State Director of Relief.

March 12—“The Status of Blister Rust Control,” speaker to be selected.

March 26—“The Tennessee Valley Authority,” by P. Neff, at present engaged on this project.

John B. Taylor, previously elected Secretary-Treasurer of the Northern Rocky Mountain Section, has been forced to resign as a result of his health. George M. Jemison has been elected to fill the vacancy.

At the December 18 meeting of the Northern Rocky Mountain Section, L. A. Campbell, Agricultural Development Agent for the Northern Pacific Railroad, discussed the Fort Peck dam and its expected effects. Mr. Campbell expressed his beliefs, (1) that the power possibilities would not be fully developed as there is already a surplus of electric power available in the Northwest, (2) that the effects of this dam on navigation below would not be as beneficial as expected because of the high costs and slow speed of river transportation, (3) that as a

factor in the control of floods in the lower Mississippi the Fort Peck dam would exert only a minor influence, chiefly because the high waters of the upper Missouri seldom reach the lower Mississippi until after the normal high stage has occurred there. This dam may, however, serve as an excellent silting basin and thereby relieve the lower river of some of this load, (4) with a present crop surplus the water is not greatly needed for irrigation, (5) cheaper sewage disposal for various cities along the Missouri River appears to be one of the tangible benefits from this dam.

The January 29 meeting of the Northern Rocky Mountain Section was held as the annual get-together between the Section and the Hoo Hoo Club of western Montana. Over 70 members of these two organizations attended.

Chairman L. F. Watts opened the meeting by pointing out the great contrast between the competition, rivalry, and even antagonism of ten years ago and the present hearty coöperation between lumbermen themselves and between lumbermen and foresters. Undoubtedly the N.R.A. and the codes required under it have done much to bring about this coöperation in a common effort to dig out of the depression.

Mr. Watts then turned the meeting over to A. L. Riefflin, president of the local Hoo Hoos, who spoke briefly about the complexity of the codes for lumber manufacturers and retailers, and the hard work that has been done by the lumbermen to produce codes complying with the spirit of the N.R.A.

Mr. H. F. Root then described some of the difficulties encountered by the manufacturers in producing their code. He stressed the great diversity of products and costs that had to be harmonized in evolving a code to apply to Arizona, New Mexico, northern California, eastern Oregon and Washington, Idaho, and Mon-

tana. The schedule finally produced is a log realization value that can be used as a market barometer in attempting to guarantee to the millman a minimum lumber price which will cover labor and milling costs. Stumpage and depreciation are not provided for. Once this minimum price is set, all millmen are prevented from selling at prices below it, and thereby ruining the market for others who must make a fair profit in order to keep on employing men.

Mr. Henry Trask then outlined the progress toward the same goal by the retail lumbermen. On the basis of past costs of operation including purchase price, handling, delivery, administration, etc., but with no allowance for depreciation, methods of computing minimum retail prices were worked out. Provisions also have been made for the posting of current prices by each dealer so that competition may be maintained for the protection of the consumer.

State Forester Rutledge Parker then described the development of Article X of the code which is intended to safeguard the public interest by insuring forest protection and perpetuation.

Southeastern

At the Olustee Experimental Forest 30 foresters and 15 guests assembled November 11, at 10 a. m. and inspected the new buildings and projects. The Naval Stores Station was next visited and the group saw a "charge" turned out of the turpentine still and the method of stilling recommended by the Bureau of Chemistry and Soils.

The group then drove through part of the Osceola National Forest to a C.C.C. camp for noon dinner. After witnessing a fire drill, an afternoon motorcade inspected turpentine work in the woods, fire line, grazing project and fire control system.

After a banquet at Lake City, a business meeting adopted, after discussions and revisions, a set of standard turpentine practices for the woods work and also for stilling.

The next meeting will be to inspect the work of the forest survey in southeastern Georgia in February.

Southwestern

A business meeting was held on December 26, 1933, at the Coronado National Forest Office during which time the officers for the ensuing year were elected. The positions of vice-chairman and secretary-treasurer are to remain unchanged. Herman Krauch of the Southwestern Forest and Range Experiment Station was elected as the new sectional chairman.

Three resolutions were adopted. The first requested that the secretary of the section write to the Chief Forester of

Mexico for the names and addresses of any Mexican foresters that might be on duty near the Arizona-Mexico border. After this information was received, it was proposed that a meeting be held on some day in the near future in Nogales or possibly Douglas, Arizona, with those Mexican foresters that cared to attend as our guests.

The second resolution urged the secretary to get in touch with those regular members in a position to contact the technical assistants that have come into the region through E.C.W. and NRA activities, and urge them to take advantage of these opportunities to increase the number of members in the section.

The final resolution urged that even though the membership of the section was small and widely scattered that a concerted effort be made to hold several meetings this coming year, the first to be held on January 30, at Albuquerque, N. M.

ANNOUNCEMENT OF CANDIDATES FOR MEMBERSHIP

The following names of candidates for membership are referred to Junior Members, Senior Members and Fellows for comment or protest. The list includes all nominations received since the publication of the list in the February JOURNAL, without question as to eligibility. The names have not been passed upon by the Council. Important information regarding the qualifications of any candidate, which, will enable the Council to take final action with a knowledge of essential facts, should be submitted to the undersigned before April 10th, 1934. Statements on different men should be submitted on different sheets. Communications relating to candidates are considered by the Council as strictly confidential.

FOR ELECTION TO GRADE OF JUNIOR MEMBERSHIP

<i>Name and Education</i>	<i>Title and Address</i>	<i>Proposed by Section</i>
Anderson, Lionel C. Colo. Agric., B. S. F., 1919	Project Supt. Mystic Camp F-1, Mystic, S. D.	Central Rocky Mt.
Batterson, Leigh J. N. Y. State, B. S., 1931; M. F., 1932	Foreman, CCC Camp, Finger Lakes State Park, N. Y.	New York
Benson, Carl E. Univ. of Minn., B. S. F., 1930; M. F. Yale, 1931	U. S. F. S. Bates, Ark.	Ozark
Bergoffen, William W. N. Y. State, B. S. F., 1931	Cultural Foreman, Alabama N. F., Moulton, Ala.	New York
Berriman, Leland F. Univ. of Calif., B. S. F., 1931	Calif. For. Exp. Sta., Berkeley, Calif.	California
Blomstrom, Roy Oregon State, B. S. F., 1931	Junior Forester, U. S. F. S., Spokane, Wash.	North Pacific
Bower, Russell W. Univ. of Calif., B. S. F., 1930	Junior Forest, Calif. For. Exp. Sta., Berkeley, Calif.	California
Brentlinger, Paul D. N. Y. State, B. S. F., 1932	Cultural Foreman, Ouachita N. F., Waldron, Ark.	Ozark

<i>Name and Education</i>	<i>Title and Address</i>	<i>Proposed by Section</i>
Brown, George K. N. C. State, B. S. F., 1930	Technician, Black Hills N. F., Deadwood, S. D.	Central Rocky Mt.
Burks, George F. Univ. of Calif., B. S. F., 1933	Junior Forester, Calif. For. Exp. Sta., Berkeley, Calif.	California
Camp, Harry W. Jr. Univ. of Idaho, 2½ yrs., Univ. of Calif. 2 yrs., B. S., 1933	Junior Forester, Calif. For. Exp. Sta., Berkeley, Calif.	California
Chisman, Henry H. Pa. State, B. S. F., 1932	Asst. Forester, CCC, Carnegie, Pa.	Allegheny
Christopherson, Ralph H. Univ. of Minn., B. S. F., 1933	Technical Forester, Camp Ripley, Little Falls, Minn.	Minnesota
Croft, A. R. Utah State, B. S., 1930; M. S., 1925, Pack Fellow, Cornell, 1933	Head, Dept. of Botany and Forestry, Weber College, Ogden, Utah.	Intermountain
Clarke, Stanley C. Univ. of Idaho, B. S. F., 1932	Extension Forester, Univ. of Idaho, Moscow, Idaho.	Northern Rocky Mt.
Davis, William L. Univ. of Mont., B. S. F., 1933	Asst. Technician, U. S. F. S., Missoula, Mont.	Northern Rocky Mt.
Dennison, Sidney V. Univ. of Calif., B. S. F., 1932	Junior Forester, Calif. For. Exp. Sta., Berkeley, Calif.	California
Diggs, Robert L. Mass. State, 1932; Yale, 1934	Timber Cultural Foreman, Lincoln N. F., Alamogordo, N. Mex.	Southwestern
Dolence, Frank L. Univ. of Minn., B. S. F., 1931	Technical Foreman, Superior N. F., Ely, Minn.	Minnesota
Durbrow, Houghton Univ. of Calif., B. S. F., 1930	Asst. Ranger, U. S. F. S., Miramonte, Calif.	California
Fischer, William F. Univ. of Calif., B. S. F., 1933	Calif. Forest Exp. Sta., Berkeley, Calif.	California
Fisher, George M. Univ. of Idaho, B. S. F., 1933	Technician, N. R. Mt. For. Exp. Sta., Missoula, Mont.	Northern Rocky Mt.
Flint, Alfred A. Univ. of Mont., B. S. F.,	Asst. Technician, N. R. Mt. For. Exp. Sta., Missoula, Mont.	Northern Rocky Mt.
Fohrman, Fred E. N. Y. State, B. S., 1930	Bureau of Forest Pest Control, N. Y. Conservation Dept., Brooklyn, N. Y.	New York
Forsythe, H. Y. (Rein.) Pa. State, B. S. F., 1925	Dist. Forester, S. C. State Forest Ser., Aiken, S. C.	Appalachian
French, Norman H. Oregon State, B. A. F., 1931	Junior Forester, Calif. For. Exp. Sta., Berkeley, Calif.	California
Fritz, Nelson H. Univ. of Mont., B. S. F., 1929	Supt., CCC Camp S-52, Grantsville, Md.	Allegheny
Feykman, Joel L. Univ. of Mont., B. S. F., 1933	Technical Foreman, N. R. Mt. For. Exp. Sta., Missoula, Mont.	Northern Rocky Mt.
Gifford, Arthur D. Univ. of Calif., B. S. F., 1931	Field Asst. Calif. For. Exp. Sta., Berkeley, Calif.	California
Gray, Walter J. Univ. of Mich., B. S. F., 1933	Cultural Foreman, U. S. F. S., Oden, Ark.	Ozark
Hamilton, James F. N. Y. State, B. S. F., 1933	Technical Foreman, U. S. F. S., Perkiinstown, Wis.	New York
Harp, Gordon D. Colo. Agric., B. S. F.	Forest Ranger, Grand Mesa N. F., Mesa, Colo.	Central Rocky Mt.
Hartman, Homer J. Oregon State, B. S. F., 1930	Junior Forester, Bureau of Plant Industry, Spokane, Wash.	North Pacific
Hawes, Edmund T. Univ. of Maine, B. S. F., 1932; Yale, M. F., Ex. 1933	Forest Culture Foreman, Carson N. F., Stopp, Okla.	Ozark
Hughes, John E. Univ. of Calif., B. S. F., 1933	Junior Forester, U. S. F. S., Redlands, Calif.	California
Jalley, William W. Univ. of Minn., B. S. F., 1933	Ranger Forester, T. V. A., Knoxville, Tenn.	Minnesota
Keeney, Kenneth A. Univ. of Maine, B. S. F., 1931; Yale, Ex. 1933	Foreman, U. S. F. S., Taos, N. Mex.	Southwestern
Kernohan, Clifford T. Jr. Univ. of Calif., B. S. F., 1931	Marker, McCloud River Lbr. Co., White Horse, Calif.	California

Kinney, Chester L. N. Y. State, B. S., 1932	Junior Forester, Allegheny N. F., Warren, Pa.	Allegheny
Clugh, Richard H. Univ. of Calif., B. S. F., 1932	Asst. in Range Research, Calif. For. Exp. Sta., Berkeley, Calif.	California
Kreutzer, Edward M. Colo. Agric., B. S. F., 1931	Foreman, CCC Camp Mystic, Mystic, S. D.	Central Rocky Mt.
London, Arthur Univ. of Calif., B. S. F., 1933	Agent, Bureau of Plant Industry, San Francisco, Calif.	California
May, Richard H. Univ. of Calif., 2½ yrs.	Technician, Calif. For. Exp. Sta., Berkeley, Calif.	California
McCutchen, A. A. Colo. Agric., 1928; Iowa State, 1929	Ranger, U. S. F. S., Cache, Okla.	Central Rocky Mt.
McLees, Kenneth C. Univ. of Calif., B. S. F., 1932	Asst. Tech. Calif. For. Exp. Sta., Berkeley, Calif.	California
Meckel, Fred A. Univ. of Calif., B. S. F., 1932	Spotter-Foreman, Insect Control, U. S. F. S., San Francisco, Calif.	California
Mors, Richard H. Univ. of Calif., B. S. F., 1933	Tech. Asst., Calif. For. Exp. Sta., Berkeley, Calif.	California
Nadler, Harry N. Y. State, B. S., 1932	Cultural Foreman, Geo. Washington N. F., Goshen, Va.	Allegheny
Nordstrom, George T. Univ. of Calif., B. S. F., 1932	Visibility Mapper, Calif. Forest Exp. Sta., Berkeley, Calif.	California
Tourse, Everett F. Univ. of Calif., B. S. F., 1933	Asst. Technician, Calif. For. Exp. Sta., Berkeley, Calif.	California
Partington, Clyde N. (Rein) Univ. of Calif., Forest and Plant Pathology, 1933	Agent, Blister Rust Control, Oakland, Calif.	California
Peteet, Wilbur I. High School graduate; 2 yrs. college subjects	Culture Foreman, U. S. F. S., Buffalo Creek, Colo.	Central Rocky Mt.
Pilmer, Harold E. Yale, M. F., 1932	Forest Ranger, Florida Forest Service, Tallahassee, Fla.	Southeastern
Renshaw, James F. Univ. of Mont., B. S. F., 1932	Forester-Foreman, ECW Camp 103, Liquin, Pa.	Allegheny
Robens, Ward H. Cornel, B. S., 1933	Cultural Foreman, Unaka, N. F., Bristol, Tenn.	Appalachian
Savage, Wilbur L. N. Y. State, B. S. F., 1931	Cultural Foreman, Morristown Natl. Historic Park, Morristown, N. J.	Allegheny
Settel, Lee S. N. Y. State, B. S. F., 1931	Junior Forester, Ozark N. F., Russellville, Ark.	Ozark
Short, Laurence R. Univ. of Calif., B. S. F., 1932	Junior Range Examiner, Calif. For. Exp. Sta., Berkeley, Calif.	California
Snowden, George L. Jr. Graduate "Hastoc School," Spartanburg, S. C.	Forester, CCC Camp No. 73, Tyler, Pa.	Allegheny
Sowder, James E. Univ. of Idaho, B. S. F., 1931	Junior Forester, Calif. For. Exp. Sta., Berkeley, Calif.	California
Spinney, Wesley W. Univ. of Calif., B. S. F., 1933	Agent, Bureau of Plant Industry, Oakland, Calif.	California
Stahelin, Rudolph Univ. of Calif., M. S., 1932	Junior Forester, Calif. For. Exp. Sta., Berkeley, Calif.	California
Stark, Eric W. Purdue, B. S. F., 1932	Graduate Student, N. Y. State College of Forestry, Syracuse, N.Y.	New York
Stowell, Morton D. Univ. of Calif., B. S. F., 1933	Junior Forester, Calif. For. Exp. Sta., Berkeley, Calif.	California
Swan, Donald A. N. Y. Ranger School, 1926	Forester, Finch, Pruyn Co. Inc., Glens Falls, N. Y.	New York
Swensen, Marriner Utah State, B. S. F., 1931; Univ. of Calif., M. S. F., 1933	Compassman and Mapper, Calif. For. Exp. Sta., Berkeley, Calif.	California
Talich, Paul H. Hastings College, B. A., 1928; Univ. of Idaho, working on M. S. F.	Asst. to Technician, U. S. F. S., Deadwood, S. D.	Central Rocky Mt.
Vance, Gordon B. Univ. of Calif., B. S. F., 1932	Crew Leader, U. S. F. S., San Jacinto, Calif.	California

Wagner, Claude A. Jr.	Foreman, Muir Woods CCC Camp,	California
Univ. of Calif., B. S. F., 1933	Mill Valley, Calif.	
Wagner, Roy G.	Technician, U. S. F. S., San Fran-	California
Univ. of Minn., B. S. F., 1932;	cisco, Calif.	
Univ. of Wash., M. F., 1933		
Wangaard, Frederick F.	Graduate Student, Dept. of Wood	New York
N. Y. State, 1933	Technology, N. Y. State College of	
Watson, Alice D.	Forestry, Syracuse, N. Y.	
Univ. of Calif., B. S. F., 1933	Asst. to Technician, Calif. For.	California
Werner, Edward H.	Exp. Sta., Berkeley, Calif.	
Univ. of Calif., B. S. F., 1932	Visibility Mapping, U. S. F. S., San	California
Wiese, Fred W.	Francisco, Calif.	
N. Y. State, B. S., 1928	Cultural Foreman, CCC Camp 13,	Appalachian
Worthington, Elmer L.	Topton, N. C.	
Colo. Agric., B. S., 1933	Technical Foreman, CCC Camp,	Central Rocky Mt.
	Pactola, S. D.	

FOR ELECTION TO GRADE OF SENIOR MEMBERSHIP

Powell, Grant M.	Dist. Forester, N. Y. Conservation	New York
N. Y. State, B. F., 1924; Harvard Forest, M. F., 1925 (Junior Member 1928)	Dept., Lowville, N. Y.	
Watson, L. N.	Asst. Forester, N. H. Forestry Dept.	New England
Gilmonton Academy, 1908; N. H. Univ., 1 yr. (Junior Member 1927)	Concord, N. H.	

C. F. KORSTIAN,
Member of Council in Charge of Admissions.



SOCIETY OFFICERS

Officers and Members of Council

President, H. H. CHAPMAN, Yale School of Forestry, New Haven, Conn.

Vice-President, EARLE H. CLAPP, Forest Service, Washington, D. C.

Secretary-Treasurer, C. M. Granger, U. S. Forest Service, Washington, D. C.

Council

The Council consists of the above officers and the following members:

	Term expires		Term expires
F. W. BESLEY	Dec. 31, 1937	E. L. DEMMON	Dec. 31, 1935
EMANUEL FRITZ	Dec. 31, 1937	A. F. HAWES	Dec. 31, 1935
WARD SHEPARD	Dec. 31, 1937	C. F. KORSTIAN	Dec. 31, 1935
S. N. SPRING	Dec. 31, 1937	HUGO WINKENWERDER	Dec. 31, 1935

Member in Charge of Admissions

C. F. KORSTIAN

Executive Offices

810 Hill Bldg., Washington, D. C.
FRANKLIN W. REED, *Executive Secretary*

Section Officers

Allegheny

J. M. Sloan, Chairman, Anthracite Forest Prot. Assoc., 514 Hazelton Natl. Bank Bldg., Hazelton, Pa.
A. C. McIntyre, Vice-Chairman, Dept. of Forestry, State College, Pa.
H. F. Round, Secretary, Forester's Office, Pa. R. R. Co., Philadelphia, Pa.

Appalachian

W. J. Damtoft, Chairman, Champion Fibre Co., Canton, N. C.
William Maughan, Vice-Chairman, Duke University, Durham, N. C.
I. H. Sims, Secretary, 223 Federal Bldg., Asheville, N. C.

California

George H. Cecil, Chairman, Chamber of Commerce, Los Angeles, Calif.
Jay H. Price, Vice-Chairman, U. S. Forest Service, San Francisco, Calif.
Russell Beeson, Secretary, U. S. Forest Service, San Francisco, Calif.

Central Rocky Mountain

W. J. Morrill, Chairman, 617 Remington St., Ft. Collins, Colo.
Wm. R. Kreutzer, Vice-Chairman, Box 567, U. S. Forest Service, Ft. Collins, Colo.
H. D. Cochran, Vice-Chairman, (Denver) U. S. Forest Service, Denver, Colo.
C. L. Van Giesen, Secretary-Treasurer, U. S. Forest Service, Ft. Collins, Colo.

Gulf States

P. M. Garrison, Vice-Chairman, Bogalusa, La.
Robert Moore, Secretary, University Station, Baton Rouge, La.

Intermountain

Dana Parkinson, Chairman, U. S. Forest Service, Ogden, Utah.
 Charles N. Genaux, Univ. of Idaho, Southern Branch, Pocatello, Idaho.
 H. N. Shank, Secretary, U. S. Forest Service, Ogden, Utah.

Minnesota

L. W. Rees, Chairman, Div. of Forestry, University Farm, St. Paul, Minn.
 S. R. Gevorkiantz, Secretary-Treasurer, Lake States Forest Exp. Sta., Univ. Farm, St. Paul, Minn.

New England

A. C. Cline, Chairman, Harvard Forest, Petersham, Mass.
 H. J. MacAloney, Secretary, Northeastern Forest Exp. Sta., 335 Prospect St., New Haven, Conn.

New York

H. P. Brown, Chairman, N. Y. State College of Forestry, Syracuse, N. Y.
 W. M. Harlow, Secretary, N. Y. State College of Forestry, Syracuse, N. Y.

Northern Rocky Mountain

L. F. Watts, Chairman, U. S. Forest Service, Missoula, Mont.
 J. E. Ryan, Vice-Chairman, U. S. Forest Service, Newport, Wash.
 Geo. M. Jemison, Secretary, U. S. Forest Service, Missoula, Mont.

North Pacific

H. J. Andrews, Chairman, U. S. Forest Service, Portland, Ore.
 S. A. Wilson, Secretary-Treasurer, Pac. N. W. Forest Exp. Sta., U. S. Court House, Portland, Ore.
 Vice-Chairman, Oregon: S. V. Fullaway, 510 Yeon Bldg., Portland, Ore.
 Vice-Chairman, Washington: C. S. Chapman, c/o Weyerhaeuser Timber Co., Tacoma, Wash.
 Vice-Chairman, British Columbia: R. C. St. Clair, District Forester, Vancouver, Can.
 Vice-Chairman, Hawaii: C. S. Judd, 1828 Vancouver Highway, Honolulu, Hawaii.
 Vice-Chairman, Alaska: B. F. Heintzleman, U. S. Forest Service, Juneau, Alaska.

Ohio Valley

Stanley, S. Locke, 121 State Capitol, Springfield, Ill.
 T. E. Shaw, Secretary-Treasurer, Purdue University, Lafayette, Ind.

Ozark

Glen Durrell, Chairman, Okla. Forest Service, Broken Bow, Okla.
 Wilson Martin, Vice-Chairman, Highland Rim Office, Dickson, Tenn.
 Charles A. Gillett, Secretary, 1923 N. Tyler St., Little Rock, Ark.

Southeastern

R. E. Benedict, Chairman, Brunswick, Ga.
 H. M. Sebring, Vice-Chairman, Asst. State Forester, Atlanta, Ga.
 C. H. Coulter, Secretary-Treasurer, Box 411, Lake City, Fla.

Southwestern

Herman Krauch, Chairman, Ft. Valley Experiment Sta., Flagstaff, Ariz.
 William H. Zeh, Vice-Chairman, 606 N. 12th St., Albuquerque, N. M.
 Bert R. Lexen, Secretary-Treasurer, Bin G, Flagstaff, Ariz.

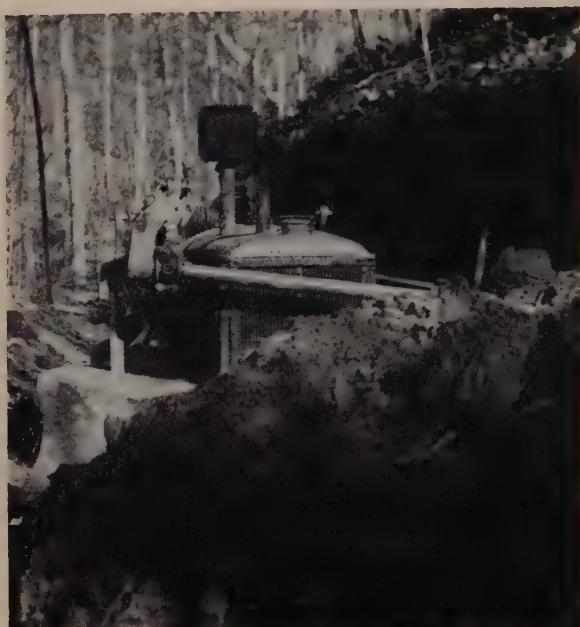
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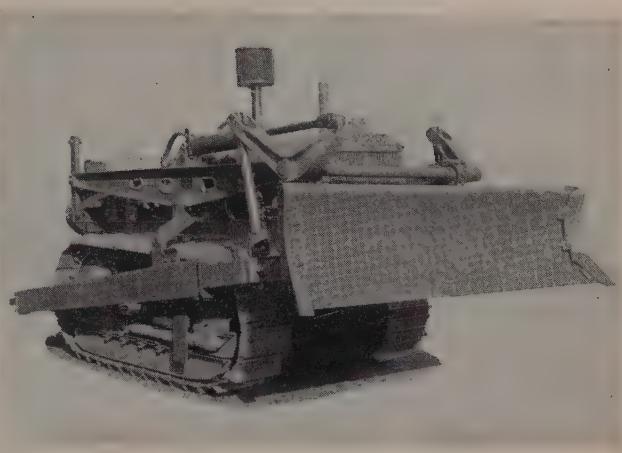
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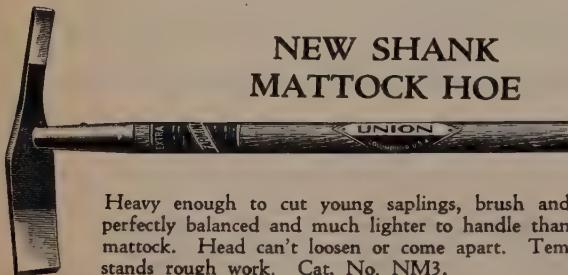
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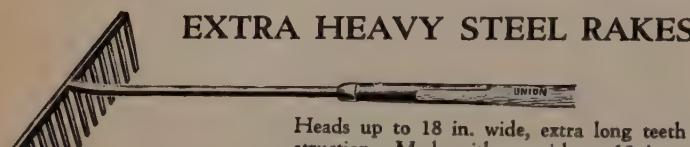
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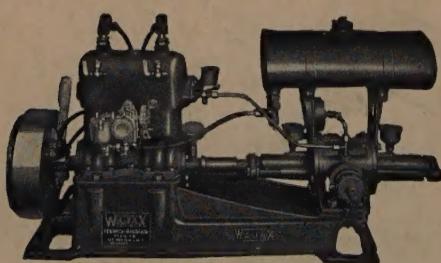
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